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A MANUAL OF CORRECTIVE
GYMNASTICS



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SWING THE ARMS UP AND DOWN AT THE SIDES
(Exercise VIII, page 217.)

A Manual of Corrective Gymnastics

By

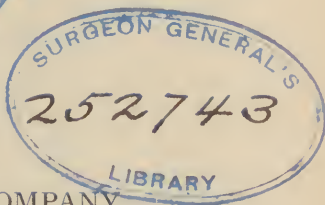
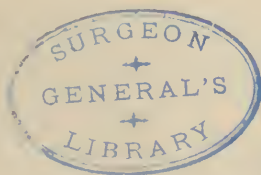
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PREFACE

With the increasing demand for corrective gymnastics in the schools as well as in the colleges, it has become necessary to stress more and more this branch of physical education in the training of instructors for this work. Many excellent books have been written giving methods of examination, descriptions of symptoms, and some directions for the treatment of the different types of cases usually found in a corrective gymnasium. Each of these books, however, gives only a few exercises, and each of those, as a rule, for one special type of case.

In my own work, as director of corrective gymnastics for girls in the University of Wisconsin, I have felt the need of a book which would give exercises for the many types that are treated in a corrective gymnasium and which could be used both as a textbook and as a reference book. It was for this reason that I first planned this book. During the months in which I have worked over it, I have learned to think not only of the students in schools of physical education but also of the many instructors who, trained before the demand for corrective gymnastics was so universal as at present, are now forced to add to their other work one or more classes in this subject.

I have had many letters and visits from graduates, not only of the University of Wisconsin, but from other

schools of physical education, who have wanted advice as to the best methods of handling corrective work with large groups. Many of these have told me of the great need of a book in which could be found a number and variety of suitable exercises.

It is to meet these two needs that I offer this book. I have tried to describe the exercises as simply as possible, so that they may be used for quick reference. I have called attention to the errors that are generally made in taking them, and have offered suggestions as to the method of presenting the exercises in order to prevent these errors.

It has been suggested to me that as my chapters on organization are written about classes of girls and as, for convenience, I have, in referring to students, used the feminine pronoun, I should include in the title of this book the words "for women and children." I have not thought this advisable for several reasons. In the first place some of the methods of organization used are the results of my experience in giving corrective gymnastics to soldiers in France during the late war. I have also used these methods in instructing men in my normal therapeutic classes, and they have assured me that they found them practicable in their classes for men. And, finally, the majority of exercises given can be used in the treatment of the conditions indicated whether these are found among women or men.

I wish to express my appreciation to my friends at the University of Wisconsin for their interest, and for the encouragement they have given me during the preparation of this book: to Miss Leila Bascom and

Miss Catherine Hall for assistance in the construction of the book, to Miss Katherine Loose for several of the photographs I am using in the chapter on feet, and to the seniors and freshmen of the Physical Education Department of the University of Wisconsin for helping me efficiently and willingly as models for other of the photographs.

I especially wish to acknowledge the great assistance given me by Miss Esther Klein in planning for the illustrations, some of which she drew, and for the chapter on the treatment of subnormal cases, which she wrote.

LOUISA C. LIPPITT.

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A MANUAL OF CORRECTIVE
GYMNASTICS

CHAPTER I

CORRECTIVE, OR THERAPEUTIC, GYMNASTICS AS A PART OF PHYSICAL EDUCATION

Changes in physical education in recent years.

The addition to courses in physical education of a branch termed *corrective*, or *therapeutic*, *gymnastics* is of rather recent date, and in many schools corrective work has not yet become a required subject. It may be considered a new science, which has developed as the field of physical education has broadened. It results from the realization on the part of instructors in physical education of the benefit to be derived from properly directed individual exercises.

Introduction into England of exercises for women.

The history of the many changes which have taken place in physical education, particularly for women, is as quaint and interesting as is the history of the changes in the style of dress considered correct for women in the gymnasium. "Female Gymnastics" was introduced into England in the year 1826 by Signor Voarino, an Italian. The book which he wrote as an appeal to the "aristocracy" to permit and encourage this form of exercise among the "young ladies" of England, with the arguments which he used, is most interesting and amusing to us of this present day of strenuous sports and apparatus work for girls.

After stating that "the introduction of gymnastic exercises into the system of education will constitute a remarkable epoch in the annals of history," he goes on to say, "Exercise is universally acknowledged to be essential to the preservation of health. It is invariably recommended by physicians, who in their daily practice have occasion to witness the melancholy effects of those habits of inaction which so generally prevail among the female portion of society, more especially in large cities and towns."

Voarino's method. His method, which was developed "to restore health to persons who have long suffered under bodily infirmities, to check incipient deformities, and to lay the foundation of health and vigor in those who are yet in the earlier stages of life," has, he says, already been practiced in the most "respectable seminaries" of Great Britain. He describes it thus: "It consists of a regular and gentle course of gymnastic exercises, tending to correct deviations of the spine, to increase the strength and flexibility, and to impart a degree of energy to feeble constitutions." Later he says, "In the composition of my work I have, I hope, paid so strict an attention to decorum as to remove the objection of the most delicate and fastidious."

If one may judge by the two exercises given below, he has indeed done so.

"At the word *Attention* the pupil must lay the left hand on the chest, the thumb and forefinger spread, the other three shut; the right arm is first to be turned behind the back, then brought forward and extended to the height of the shoulder."

“Standing with arms akimbo, rise to tiptoes then gently lower the body, bend the knees and body, and extend the arms forward, nails up. Place the elbows on the knees and let the whole body weight rest on the toes. Then rise with great lightness and return to the first position.”



STYLE OF WOMAN'S GYMNASIUM SUIT WORN IN ENGLAND IN 1827

Copies of illustrations in Voarino's *Female Gymnastics*.

Whether the “Wall Exercise” is quite so “decorous” is a question that inspires interested speculation. Here it is: “Face down, on the hands and feet, creep up the wall with the feet, keeping the weight on the hands. Go up until you can kiss the wall between the arms.”

Changes in gymnasium dress for women. The changes in "gymnasium dress" are no less interesting. As pantalettes were the style at the time of Signor Voarino's activities (1827), pantalettes must be worn in the gymnasium, the skirt must come down well



WOMAN'S GYMNASTIC COSTUME IN 1842

Copied from an old picture.

to the ankles, and neck and arms must be covered. When Signor Voarino tells us that "it will be absolutely necessary for the pupil to wear the calisthenic dress, as the usual female dress will impede her movements," we are curious as to how she could decorously do the "Wall Exercise" described above.

In the year 1842 came a change in the "gymnasium dress" for women, and another in 1864, neither of which seems to us of the twentieth century to have produced a dress allowing freedom of movement. And even after gymnastics for women had been introduced into some schools in the United States, the dress was most discreet, and girls engaged in active sports only out of sight of the ordinary man. But as the years passed and the world became accustomed to the fact that gymnastics were as essential for women as for men, great changes began to take place, not only in the type of sports, gymnastics, and gymnasium dress for women, but also in the attitude of the world toward public demonstrations of their work. Possibly the world began to see the truth of Signor Voarino's words: "The advantages of exercises which have hitherto belonged too exclusively to gentlemen are of equal, if not superior, importance to females, as they impart that elasticity and grace which give an indescribable charm to the female form and carriage."



WOMAN'S GYMNASIUM SUIT
IN 1864
Copied from an old picture.

Value of exercises for women recognized. Certain it is that, when physical education for women became better known, its value as a means to health was soon

recognized. The exercise provided, causing, as it did, improved circulation, better coördination, quickness of movement, improved posture, and many other benefits both to mind and body, was of unending

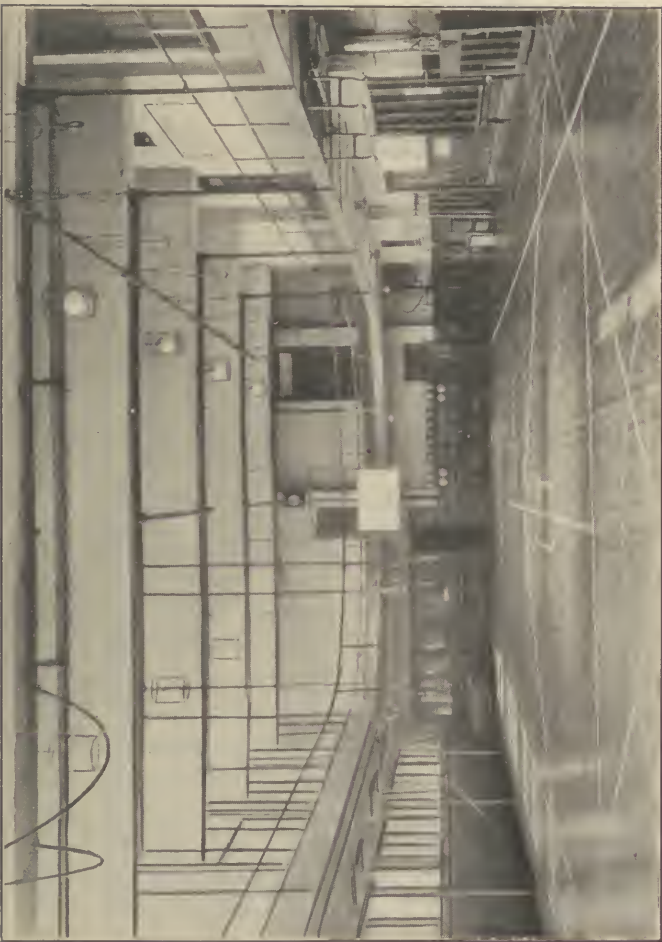


THE CALISTHENIC HALL

From *Vassar College and Its Founder*, by Benson J. Lossing, New York, 1867.

value to those taking part in it. And gradually, as gymnasium equipment improved and shower baths were added, the instructors began to realize how much good could be done through informing the members of their classes in matters of general hygiene. This

A MODERN GYMNASIUM



instruction came to include lessons in regard to bathing, sleeping, eating, the importance of fresh air, and many other matters pertaining to right living.

Special corrective classes introduced. At first, when these classes were small, individual oversight and assistance could be given; but, as the classes increased in size, it became more and more difficult for the instructor to give close attention to each member of the class. To meet this situation, those individuals who needed more careful supervision than the majority were selected from the groups and formed into separate classes. Such special classes were first organized to take care of faulty postural conditions, but it soon became apparent that there were many other conditions which could be benefited by this type of work.

Corrective exercises should be given by trained instructors. Naturally, corrective gymnastics, whether for men, women, or children, ought to be in the hands of persons trained for that special work. As few school systems, however, are either able or willing to pay for an instructor in physical education and a specialist in corrective gymnastics as well, it has become necessary to train all students preparing to teach physical education in this special branch of the work. In a large school or college an instructor should not, of course, be expected to take charge of both branches, but a knowledge of corrective work ought to be of use to any instructor in his or her general work, for there are many opportunities during the hours of sports and gymnastics when a helpful word regarding health and posture may be given to the students.

Orthopedic examinations should benefit the person examined. The custom of giving individual orthopedic examinations in schools and colleges has become almost universal. In some schools, however, where such examinations are given, there is no follow-up work. This omission does not seem to be just to the students nor sensible in any way. Occasionally a student, or his parents for him, will take some beneficial action as a result of the examiner's report, but as a rule neither student nor parents will know what to do nor how to do it. Frequently there is no realization of the importance of remedial action. Why put a student through the form of taking a physical examination to find out what defects are present if no instruction is thereafter to be given as to how these conditions may be improved? The correct course is, naturally, to examine the student, tell him clearly and fully the exact conditions which are found, instruct him in the means whereby such conditions can be corrected, and then give him the necessary supervision to enable him to do this work as it should be done.

Heads of schools should consider the physical condition of students. Surely the condition of the body should concern those at the heads of our schools and colleges as much as the condition of the mind. Within the past few years, owing, no doubt, to what has been published concerning the poor physical condition of American men as a whole, there has been a great change in the general attitude toward corrective gymnastics. Very few colleges, however, are taking care of this branch of education as they should. Women's colleges



THIS WORK OF PREVENTION SHOULD BEGIN IN THE ELEMENTARY SCHOOLS
Note defective posture resulting from carrying books improperly.

are perhaps doing more for their students than men's colleges are for theirs. But, after all, should the work be left entirely to the colleges? Is it fair to let so large a percentage of both men and women grow to college age without this instruction? It does not seem right that "posture classes" and "foot classes" should be very large even in a large college. As a matter of fact, this work of prevention should begin in the elementary schools, and continue in the high schools, so that when boys and girls go to college they will have such knowledge of their bodies and the correct methods of using them that they will not have to give time to this corrective type of work. As for those who never reach college, what physical help will they ever get unless corrective gymnastics is offered in the preparatory schools?

CHAPTER II

QUALIFICATIONS NECESSARY FOR INSTRUCTORS IN CORRECTIVE GYMNASTICS

In order to be successful in corrective gymnastics, an instructor should have certain definite qualifications.

Desire to heal. The first of these qualifications is a genuine desire to heal—to help others to reach a higher plane of health. In other words, if one is to be a helpful instructor, one must have the “doctor instinct.” There is an old saying that doctors and nurses are born, not made. Those who have lived for years in training schools for nurses know that this is not always true, nor need it be true of those who do corrective work. But that there should be a genuine interest in the work, an interest strong enough to make one put one’s whole heart into it, is essential.

If the instructor has this genuine interest in corrective work, few pleasures that come to her can be greater than the knowledge that, through her own efforts, she has been able to help a crippled child to walk or to teach a delicate girl such an understanding of her body and its care as will enable her to grow to a healthy womanhood.

A cheerful disposition. An instructor in corrective gymnastics needs to have a cheerful disposition. Among the trials which such an instructor has to

meet, especially in a college where gymnasium work is required, is the attitude of freshmen assigned to her department. Since many of them have had no previous instruction as to the condition of their bodies, they see no necessity for entering the corrective classes. Then, too, they are disappointed at being cut off from the more active sports which their friends are enjoying. As a consequence, their attitude, during the first part of the year, is likely to be antagonistic toward the work. To meet this attitude the instructor must have amiability, courage, and patience and be ready to use every means in her power to interest and instruct. It is a discouraging task to assist a student who does not want to be assisted, and who really resents another's efforts to give her assistance; but the instructor should regard this difficulty as a challenge to her own power; she should not lose patience, but should put forth every effort to overcome the pupil's resentment as quickly as possible. This difficulty does not, of course, arise in classes where the students have sought correction, but it is likely to be found in any group where the work is required.

Patience. There are other reasons for the cultivation of patience, in that the instructor must be ready to answer questions, to take an equal interest in all questions, and be willing to reply on each occasion as simply and carefully as if she had not answered the same question many times before. She must also be ready to repeat instructions again and again, for few students can quickly acquire the technique necessary to get the best results from an exercise.

Sympathy. In order to be a good corrective instructor, she must be sympathetic, she must be ready to listen to the troubles of others, she must try to see the student's side of a question. Even though she herself is healthy and vigorous, she must be ready to understand those who are not, and must be very patient with those less favored than herself. Not only must she know how to use her strength to help the less vigorous, but she must, at the same time, be so tactful as not to wound the student by emphasizing the contrast between the instructor's vigor and the pupil's weakness. As a matter of course, the instructor who is truly sympathetic will also be tactful.

Courage. A corrective instructor must have courage to persevere and the power of encouraging others to do likewise. Muscles develop slowly, and improvements in conditions of the body appear at times almost impossible to obtain. It is only through perseverance and courage that the desired end is ever reached.

Correct posture. A corrective instructor must hold her own body well. It is not easy to make students feel that a good posture is possible or necessary if the instructor, who is supposed to know the reasons for good posture and the best methods of obtaining it, stands before her class with head held forward, drooping shoulders, and prominent abdomen. Students are quick to see the absurdity in such a situation, and such an instructor is in danger of losing their respect and thus of failing to get the coöperation that is necessary to the obtaining of good results in her work with them.

Personal cleanliness. Corrective work brings the instructor into such close personal touch with those with whom she works that she must always be clean and dainty. The use of strong perfumes and highly scented powders is not in good taste for anybody, certainly not for anybody who is working closely with others. One of the first facts that is taught to pupil nurses in hospitals is that they must remember that what may be pleasant to themselves may be most disagreeable to those with whom they work; and the same rule holds for instructors in gymnastics. The instructor's gymnasium suit should be clean and neat; her hair should be carefully arranged; she should, in every respect, present a trim, professional appearance.

Thorough knowledge of the work. A thorough knowledge of corrective work in all its branches is necessary. It is the instructor in charge who must examine, diagnose, prescribe, and give treatments to the students. Her responsibility is great; therefore she should not be satisfied with half knowledge nor with careless work. Much injury can be done in this type of work if it is not correctly conducted. In many of the cases with which a teacher works, it is especially important that time should not be lost. Indeed many of the cases should have been treated long before they came to the knowledge of the instructor. Delay will make it still more difficult to correct the defects which are found, so that the instructor must do her best, not only to prescribe and direct the work as it should be done, but to make the student herself realize the reasons for a real effort on her own part.

Trustworthiness. A corrective instructor must be trustworthy. She must remember that the physical conditions that she finds and the related facts that are told her by the students must be regarded by her as matters of confidence just as they would be by doctors, nurses, and clergymen.

Enthusiasm. She must believe in her work and be able to carry it on with enthusiasm and to impart the same spirit to those with whom she works. She must feel a genuine interest in each individual student and a real desire to accomplish all that is possible in every case. It helps the instructor to do all that is set before her, if she keeps reminding herself, when working with very many, that the important matter to each student is her own condition. If the instructor is really to help, all personal and other matters must be forgotten. To put it briefly, the instructor must put her whole mind upon the student's needs.

Eagerness to learn. The instructor must never be so satisfied with her own methods that she cannot listen to others. Progress in this work is constantly being made. A wider knowledge and understanding of pathological conditions are being taught, new methods are being developed, and discoveries are being made. The instructor must continue to study, to read, to visit other schools, and to try in every way to increase her knowledge and skill. The instructor who feels that her knowledge is so great that she need no longer study has reached the end of her usefulness and had better drop out and leave the work to others.

CHAPTER III

SCOPE OF CORRECTIVE GYMNASTICS

Scope of corrective gymnastics. In the general gymnasium classes, even before it had a special department, corrective gymnastics had for its object the giving of extra oversight to those who were in need of it, although the only conditions treated originally were faulty posture and weak feet. But during the last few years corrective gymnastics has very noticeably widened its scope, so that the term now applies to the work of a department which takes care of all those who need remedial exercises for orthopedic and related conditions, and which prescribes the proper amount of exercise for those who are not strong enough to take part in heavy sports and gymnastics.

Its value recognized by physicians and surgeons. One reason for the growth in this work is that its value is now recognized not only by orthopedic surgeons, but by the medical profession as a whole. It has also been helped along by the progress which has been made in orthopedics within the last few years, for the field of orthopedics is much broader than it was before the World War.

Division into two departments. It is the custom in some schools to divide the course in corrective gymnastics into two departments,—one termed the “Corrective or Orthopedic Department”, the other, the

“Department of Medical or Remedial Gymnastics.” This division serves to give some idea of the growth and development which has taken place in this type of work. The division is not an accurate one, since both types of work are really orthopedic. For the want of better terms, however, we shall make use of these in discussing the types of work which come under the corrective department of physical education.

*Types of Work Done in Corrective or Orthopedic
Gymnastics*

I. IMPROVING THE FUNCTIONS OF THE BODY

a. The circulation — by hastening the return in veins and lymphatics, and by increasing local blood supply.

b. The nervous system — by soothing the spine and nerve trunks, or by stimulating nerve action where stimulation is necessary.

c. The respiration — by increasing the lung capacity with deep breathing and improved posture.

d. The intestinal tract — by increasing muscle tone and muscle contraction.

e. The general muscular condition.

II. CORRECTING ORTHOPEDIC DEFORMITIES

a. Postural defects, as faulty anteroposterior and lateral curves, both flexible and structural.

b. Pronated (or flat) feet.

c. Weak joints, common in wrists, ankles, and the sacroiliac region.

d. Paralysis — infantile, obstetrical, spastic, traumatic, and hemiplegic.

e. Conditions caused by rickets and malnutrition.

III. RELIEVING PATHOLOGICAL CONDITIONS ARISING
FROM INJURIES, DISEASE, AND STRAINS FROM
HABITUAL MISUSE OF MUSCLES

a. Strains and sprains.

b. Adherent scar tissue.

c. Deformities following injuries.

d. Atrophied muscles.

e. Different forms of neuritis, such as sciatica, and writer's cramp.

IV. AIDING IN THE EDUCATION OF MENTAL AND MORAL
DEFECTIVES

V. IMPROVING CONDITIONS OF IMPERFECT COÖRDINATION AND BALANCE

*Types of Disorders Treated in Medical or Remedial
Gymnastics*

I. RELIEF IS GIVEN TO SUCH CONDITIONS AS

a. Ptosis.

b. Constipation.

c. Menstrual disorders.

d. Cardiac weakness.

e. Neurasthenia.

f. Digestive disorders.

g. General debility and excessive fatigue.

A broad field covered. As can be seen, corrective gymnastics is expected to cover a very broad field,

and in a large university most of the foregoing types of work are needed. In the University of Wisconsin, in the several years of experience we have had, we have been called upon to treat all except three of the abnormal conditions cited above. The three exceptions are mental and moral defects, hemiplegia, and adherent scar tissue.

Supervision of orthopedic surgeon needed for some work. It is needless to say that much of this work should be done only under the supervision of an orthopedic surgeon. Had it not been for the assistance and advice which we have received in the University of Wisconsin from the medical clinic of the university and the realization that the clinic stood ready at any time to give us assistance and advice, it would not have been possible for us to carry the responsibility of the many types of cases we have had to consider.

Too much should not be undertaken by the instructor alone. We feel strongly that the instructor in this work should be most careful not to undertake too much; that she should be cautious in deciding how far it is right for her to go in any treatment of the more serious conditions. Unless the student has been given a thorough medical examination by a recognized physician, she will do well to undertake only the simplest cases. Even then the instructor should have had years of experience before undertaking some cases, should be able to refer to a physician when in doubt, and should have the privilege of having the students reexamined at intervals.

In no branch of corrective work is this carefulness more necessary than in the treatment of advanced

structural scoliosis. Cases of this type should be treated by surgeons only. The instructor in physical education should understand these cases in order to point out to the student the necessity of prompt treatment and the reasons for consulting a skilled orthopedic surgeon, but the instructor should not undertake alone the treatment of such a case. A fact which is sometimes overlooked by instructors in physical education is that injury may be done to structural cases if flexibility is increased beyond the power of holding. When a surgeon is treating these cases he supports the trunk with braces or jackets as the muscles are stretched. Since an instructor in physical education has neither the skill nor the apparatus to apply these jackets, she should not undertake this stretching, but should refer these cases to an orthopedic surgeon who has the required skill and the necessary apparatus. Provided that the student is under the care of a surgeon and he so desires, an instructor may, of course, while the surgeon prescribes and applies the necessary braces or jackets, give the required exercises, and keep a close supervision over the student. Without the aid of a surgeon, however, an instructor should not attempt to treat advanced structural scoliosis by forcible stretching, but should confine herself to giving exercises to amend posture, correct pronated feet, and improve the general condition of the student.

CHAPTER IV

GIVING PHYSICAL EXAMINATIONS AND ASSIGNING STUDENTS TO CLASSES

Measures preceding class assignment. In a well-regulated school, students are assigned to both sports and gymnasium work with due consideration to their health and physical condition. Before being assigned to work in the physical education department, therefore, it is necessary for each student to be given both a "medical" and "orthopedic" examination. The orthopedic examination can be given by the instructor; this is naturally a part of her work and she should be trained in the knowledge necessary to enable her to do this intelligently. But unless the instructor whose duty it is to assign the students to classes is also a physician, she should not be expected to give the medical examination; this should be given by a physician.

The orthopedic examination, while thorough, should be as brief and as practical as possible. There is always a question of the practical results to be reached through the taking of measurements of arms, legs, chest, and chest expansions at various points, and in making tests for muscular strength. These measurements are tiring to the student, and unless done for statistical purposes are, for the most part, a waste of time both for the student and the instructor. In a small school,

to be sure, if all measurements are made by the same instructor and time is not a serious consideration, they may possibly be of interest to the student in noting improvement. But it must be borne in mind that measurements taken by different instructors will vary decidedly, even when taken upon the same day. If such measurements taken at the time of entrance are to be of interest to the student, they should be repeated at intervals during the student's stay in the school. A knowledge of height and weight, lung capacity (tested with a spirometer), history of previous work in sports and gymnastics, results of examinations for general condition and for bad orthopedic conditions of the feet and spine, together with the physician's report as to cardiac and thyroid conditions and of recent operations and illnesses, should give a sufficient understanding of the student's physical condition to enable the instructor to assign her to her class.

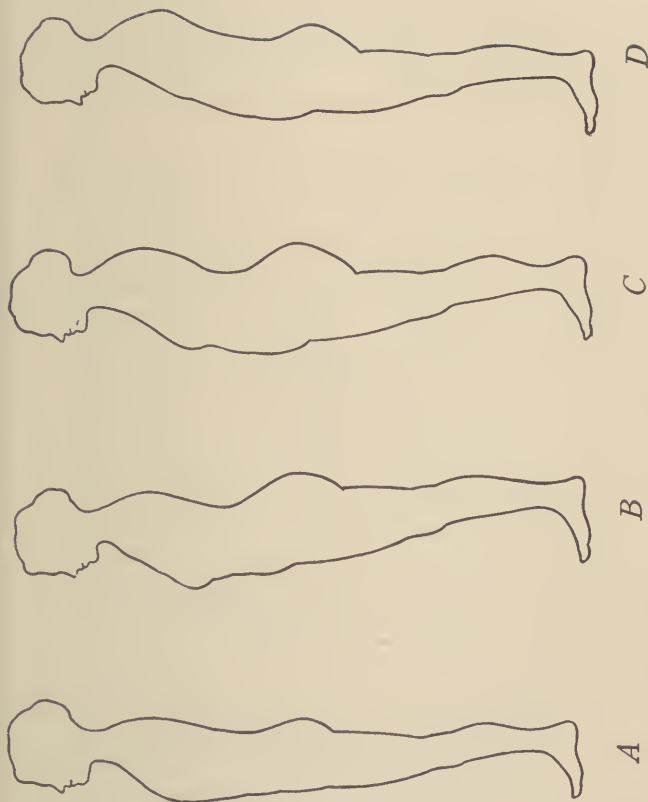
Assignment to gymnasium classes should be made by the instructor in charge of the orthopedic department. In making this assignment, the student's health, her posture, and the presence of any orthopedic deformity should be the determining factors. Both gymnastics and sports should be so planned as to give each student work which is adapted to her strength and condition. The gymnasium work may be divided into regular work for those able to take apparatus work and heavy gymnastics, light gymnastics for those not able to take strenuous exercises but not needing special or corrective work, and special gymnastics for those whose condition can be improved

by prescribed and directed exercises. In sports, the same division into heavy, light, and medium sports may be made.

Method of making the orthopedic examination.

As the object of the physical examination is to enable the instructor to give the student the work which will be most beneficial for her, it is expedient that the student should understand each step in the examination and be able to see for herself the physical conditions which the instructor finds. With this end in view the following method has been found satisfactory:

The first step consists in taking a drawing of the student with the schematograph; then her weight and lung capacity are tested. Finally, bringing these records with her, the student goes to the instructor who is to give the orthopedic examination. For this, the student stands between two mirrors so placed that, by looking into one, she can see her back in the other. As the examination of her back, shoulders, hips, and general condition is made, each step is explained to her. She has pointed out to her the hollow in her back, the forward position of her head, or any condition of posture which is not correct. She is asked to try to correct these conditions herself; that is, to stand in her "best position." This she does in front of the mirror, so that she can see for herself whether or not her posture is improved. She is then shown the schematograph drawing, which is graded before her and explained. Next, she is shown how to bring her body into its best position. Her feet are examined. If they are pronated, their condition is explained to her as well as the necessity of correcting this before



SCHEMATOGRAPH DRAWINGS SHOWING FOUR GRADES OF POSTURE

she can safely do heavy gymnasium work. She is encouraged to talk about her feet and give her own opinion of her condition, and an effort is made to arouse in her the desire for improvement. At this time, as a rule, she is told what grade of gymnasium work she will enter. Simple suggestions are then made for improvement of posture and method of walking, whereby she may be able to help herself before the beginning of indoor gymnasium work.

Generally the student is interested. She asks questions as to the chances of her being able to overcome faulty physical conditions, and in some cases she begs to be assigned to whatever department will help her most to improve her body. If this result is obtained, the time given to these explanations is well spent.

Follow-up work in posture. All schematograph drawings are graded *A*, *B*, *C*, *D*, or plus or minus of these grades. Students' names are listed alphabetically under these grades and the lists are posted on the bulletin board where are to be found all notices for students taking work in the Physical Education Department. Above the lists are hung outline drawings, posters, or pictures of correct and incorrect posture, thus pointing out to the students the effect of different types of posture upon the body, skeleton, position of the organs, or any other results which can be shown. At the end of the first semester's work, schematograph drawings are again made of the students in the corrective department, and their new grades in red ink are added to the old list. Those students who reach a grade as high as *B* — (unless, despite the high average mark, there are conditions

requiring special work) are transferred to the regular gymnasium classes. At the end of the indoor work, these tests are again repeated and posted. All freshmen not in the corrective department are drawn with the schematograph at the end of the second semester. If they are still below the required *B* — they are tested again at the beginning of their sophomore year, and, if necessary, are then assigned to posture or corrective classes.

For students majoring in physical education, the rules are rather more exacting than those for other college students. A posture grade as low as *B* — assigns them to special work. Each year, as long as they continue in the school, they are tested, and until they can reach a *B* grade they are required to take one period of posture work each week. As soon, however, as they can pass the required test, which is given them at any time that they ask for it, they are allowed to discontinue the work. But even after they have discontinued posture work, they are under constant supervision by all instructors in the department. If they become careless and do not hold their posture, either during their gymnasium work or at other times, they are reported to the corrective department; and unless they improve after their attention has been drawn to their defective posture, they are again assigned to a posture class.

Method of assigning to classes by posture grades. The corrective department has three divisions: classes for special gymnastics in which individual schedules of exercises are prescribed for each student, posture classes in which the work is done in classes,

all working together, and classes to which students are assigned for required rest or walking. To the classes in special gymnastics are assigned the worst of the postural cases, and all students with any marked degree of lateral curve. This division includes those with a *C* grade who are at all lacking in flexibility, and, with a few exceptions, all of those with a posture grade of *D*. Those students having a *D* posture grade who are quite flexible and who, under instruction, have sufficient muscle control to bring their bodies into good position, are assigned to posture classes. All students with weak feet are assigned to the special gymnastic classes; also all students having either medical or orthopedic conditions requiring individual prescribed, directed work. After the posture test at the end of the first semester, those students in the special classes who have improved greatly but have not quite reached the required grade are (unless they prefer the classes of special work) transferred to the posture classes; and those in the posture class who have not improved as they should have done are transferred to a special gymnastic class.

A request from a student for special or posture work is never refused. This permission is also extended to those seniors and juniors who wish to enter a special class though not required to take work in the physical education department.

Department of rest and walking. To that branch of the corrective department in which students are given credit for rest and for walking are assigned those students who, in the opinion of the physicians in charge, are not strong enough to take any branch

of physical education, but are in need of regular rest or outdoor exercise.

We feel that this department is, in many cases, a real help to the students; many girls, especially those working hard with their studies, do not take as much rest as they should. But when the physical education department gives them credit for the hours of rest which they take under the corrective department, they are able to take that rest with a quiet mind. They do not feel that they are shirking their studies because they lie down during the day. Many of the students express appreciation for the permission that is given them to rest in this way.

In order to get credit for rest the student is required to come to the rest room of the physical education department and each time to sign her name in a book which is kept for that purpose in the office. The hour of her rest is assigned to her, and she is expected to report at that hour. Such a rest room should, of course, be kept under supervision. The rest privilege is undoubtedly abused at times, and there are always students who fail to rest as they should; but that this scheme is a necessary part of a physical education department where work is required is unquestionably true. Nor does it seem right that the good of the many should be sacrificed because of a lack of honor on the part of a few.

Those students who walk for credit are selected by the medical clinic. This walking, which is always for a definite length of time, should be done in groups headed by an instructor or by a student who is appointed for that purpose. The length of such walks

should depend upon the strength of the students in each particular group, shorter walks being arranged for those students who are not able to take long hikes. A roll should, of course, be taken each time, and records of the attendance should be kept.

Sometimes a combination of rest and walking may be made, the student taking two hours of rest and two of walking, or, on stormy days, giving the entire time to rest.

CHAPTER V

CORRECTIVE EXERCISES IN CLASSES AND WITH INDIVIDUALS

Group corrective work. Giving corrective exercises in large classes may seem to some persons quite impracticable, for "corrective exercise" and "individual exercise" are considered synonymous terms. In small schools and in the gymnasiums of orthopedic surgeons, they are one and the same thing. But in large schools and universities where gymnasium work is required and the number of students to be instructed is large, class corrective work becomes an absolute necessity.

Size of ideal class. Ideally, a corrective class that is to be taught by one instructor has an enrollment of about eight students. In a class of this size the instructor can, during the class period, come in touch with every girl; in such a class, therefore, individual exercises can be given. In most large schools, however, the number enrolled in a single class must be much greater than this, and the usual class period of one-half hour is so quickly over that, no matter how willing and industrious the instructor may be, she will find at the end of the period that she has been able to give instruction to only a few in the class and that there are many to whom she has not had opportunity even to speak.

Work in class should be individual. In classes of this type each student should be made to feel that the instructor has a personal interest in her, understands her particular condition, is ready and willing to explain to her individually the object of the exercises which she has been told to take, and to answer any questions concerning the student's condition and her hope of correcting it. Without this personal touch the student usually takes little interest in her work. She must understand before she can be interested, and unless she can be made to take an intelligent interest, practically nothing is accomplished.

Benefit to be derived from class work. When the period begins with a general class exercise the students all stand before the instructor, who can thus observe their individual posture. While moving about the class later she can speak to the girls individually, answer their questions, and in a low voice give them personal instructions and suggestions.

Many of the exercises, particularly those given to improve posture, are taken by all of the corrective group and when used for class exercises are taught to large numbers of students at once. At the beginning of the semester's work, it is well to select girls who are to use the same exercise, and to explain to them in a group its purpose and the correct method of doing it. These group exercises are given in addition to the class exercises, which occur at the opening of the class hour.

Ideal class of one type only. The ideal corrective class should have in it only students having the same types of conditions to be treated; then the work

of prescribing and giving exercises would be quite simple. But the classes which must be instructed are often composed of students in all sorts of condition — strong, healthy girls who have poor posture or pronated feet, girls who have menstrual disorders, active thyroids, weak hearts, or knees which become easily dislocated, and girls with other conditions needing correction. With classes of this type the work is much more difficult. The first exercises must be those in which all can safely join, for at first the girls who are not quite strong, or who have some peculiarity, are sensitive about being told to drop out of an exercise. Later, as a girl becomes accustomed to the work and to the instructor, she learns to stop when she becomes fatigued or if the exercise proves to be one which is not just suited to her special condition.

Exercises should be demonstrated. Each exercise should be carefully explained to the class. Stress should be laid on the results to be expected, and why and how this particular exercise is to give these results. Then the correct method of executing it should be demonstrated two or three times before the class, the instructor standing in turn before different sections of the class so that all may see the demonstration. The exercise should next be given slowly and the orders given in an informal, explanatory way. All corrective exercises should be given slowly. Each girl should be made to understand that she is working, not for snap or form, but to develop a certain set of muscles in her own body. She should aim to achieve results for her own benefit; hence, good posture should never be sacrificed for the sake of the exercise.

One characteristic which is noticeable in a class of the type just described is a lack of coördination and muscle control. In spite of the fact that each exercise has been carefully explained and demonstrated and has then been given very slowly so that each student may have time to think as she works, at least a third of the class are likely to fail to execute it correctly. For this reason the demonstrations must be repeated and the errors made must be pointed out again and again.

Foot exercises given under supervision. Foot exercises, until they are thoroughly learned, should be taken under supervision; for if they are to be of any benefit they must be done with exact technique. Most students find them difficult. While doing these exercises the girls should be required to remove their shoes; and when demonstrating, the instructor should remove hers.

Each student should have her own card of exercises. After the class exercises are completed each student should be given a card of exercises which has been prepared to suit her individual case, and she is expected to go on with her work regardless of what others in the gymnasium are doing. Each student should be permitted to see her diagnosis card and should have her condition explained to her. Any questions which she asks should be answered, even if these questions take her into the fields of anatomy, orthopedics, and medicine; and every effort must be expended to make her take an intelligent interest in her own condition and the means which are being used to improve it. Individual demonstration and instruction must be



FOOT EXERCISES GIVEN UNDER SUPERVISION

Instructor is demonstrating and normal student assisting.

given, and the student should be watched as she goes through her schedule to be sure that she understands each exercise and can execute it correctly. With large classes this supervision is most difficult, and the girls themselves sometimes make it even more difficult by their apparent reluctance to ask questions. Many will go blindly on, doing their work in a listless manner, with no clear idea of the object of the exercises, and no interest in them because they do not understand what they are doing. These students can, as a rule, be picked out by the instructor because of the way they do their work; and frequently, after they have received personal instruction and explanation, their whole manner will change. Many times such a student is heard to say, "Why, I had no idea that there was so much in corrective exercises! I think it is much more interesting than regular gymnastics, for here you are working for a purpose and not just to exercise."

Keeping in touch with each student. Frequently the size of the class makes it practically impossible for a student to get an opportunity to speak to the instructor, since there are so many girls trying to do this same thing. A student may thus drift along from day to day, wishing to ask questions personal to herself, and not finding her opportunity. To meet this situation, it is wise to ask, just before dismissing the girls after the general class exercises, if there are any who do not understand their work or who would like to speak personally to the instructor. Even then there are some who will hesitate to speak. To reach these, the following has been found a good plan:

Each girl has her own card of exercises which she keeps in her locker and brings with her when she comes to class. If she wishes to speak to the instructor, either to ask for assistance or explanations, if she would like an exercise to correct some condition which she feels should be corrected, if an exercise gives her pain, if she does not think that she is improving, or if she has any other reason for wishing to communicate with the instructor, she may make a note of the fact on her exercise card and slip it into a large envelope on the desk in the gymnasium. This envelope should be examined after each class. If a note in answer is all that is necessary, this is written on the card, and the student receives it when she next comes to class. If a personal interview is best, that is given her on the next class day.

Sometimes there will be a student who, in spite of all that can be said or done in class, does not become interested and works only enough to keep her from being conspicuous. In the department in which the author has been working a girl of this type is called into the office in order to try to find out from her the reason for her lack of interest. At this time we put before her clearly her own condition and show her by books and photographs the more serious conditions which are likely to follow if she makes no effort to correct her body. We tell her of the work of the many men and women who are devoting their time and energy to helping others to prevent and cure these very conditions. We try to make her feel that this work is not a fad that has originated in our brains, but a science which has been developed through the

efforts of some of the cleverest men and women in the world. At the end of the interview the matter is left entirely in the hands of the girl, and she is plainly told that she may stay in the class or not as she herself decides, but that, if she does stay, she will have to change her attitude and habits of work — that we do not care to have her in the class unless she does. We have never yet had to transfer a girl from the corrective department after an interview of this kind. On the contrary, these girls have almost invariably gone into the work afterward with their whole hearts, not only doing good work themselves, but also helping other students to see the importance of improving their posture and health by corrective exercises.

Exercise instructions provided. When classes are small it is possible to write out the exercises on each card, but when classes are large it is impossible to do so. The following plan for large classes is therefore suggested: All exercises are written out plainly and simply, with explanations of technical terms; and a sufficient number of mimeographed copies are made to provide one for each student in the class. The exercises are grouped according to their purposes, and these groups are numbered as are also the exercises included in each group. Then a girl's prescription of exercises, indicated by number, is written on her diagnosis card. So that the diagnosis card may not be lost, each student copies the numbers of the exercises which she is to take, keeping this copy and bringing it to class each day, while the original card is filed. Until the student can remember how to do her exercises she keeps the mimeographed instruction



EACH STEP NECESSARY TO BRING THE BODY INTO GOOD POSITION IS EXPLAINED

with her during her work, returning it to the instructor's desk before leaving the classroom.

Work should be educational. When the class work first begins it is explanatory and theoretical. The few exercises which are given are for the purpose of demonstration, so that the student may test for herself the truth of what is being told her. The student should understand and believe the necessity for the work in her own case — her reason should assure her that the theories and methods presented are correct. On the first day, the students may sit while the requirements of dress and attendance, the diagnosis cards, the purpose of the mimeographed exercises, and the means which in large classes they must use to communicate with instructors, are explained to them. They must be told never to do an exercise which strains or hurts them, but to omit it until they have talked it over with the instructor. They must be urged to coöperate by asking questions either in class or privately; they must understand the wish and endeavor of their instructors to make the exercises suit each case exactly, and must be urged to state if there is some physical condition needing attention which is not taken care of in their list of exercises.

Teaching correct posture. On the second day the posture work may be begun. On this day the class is lined up before the instructor, all the students wearing their gymnasium suits. Beginning with the feet, each step of the correction necessary to bring the body into good position is explained. The reasons for the straight foot are explained and demonstrated. The bones of a foot and leg are shown, and there is a



A



B



C



D

CHART OF THE FOUR POSTURE GRADES SHOWING THE POSITION OF THE RIBS AND BREASTBONE AND THE TILT OF, THE PELVIS IN EACH POSTURE

demonstration of the effect upon the foot of turning the toes out, the instructor removing her shoes in order to show this more clearly. From the feet the instructor goes over the rest of the body, dwelling on the position of the knees, the position of the pelvis and its effect upon the lumbar region, and the position of the neck. A skeleton is used during these lessons, so that the student may understand why the tilt of the pelvis affects the lumbar region, or why the position of the neck and head affects chest and abdomen. Outline charts of different postures *A*, *B*, *C*, and *D*, are shown, with the effects of these postures upon the muscles, organs, circulation, and general condition of the body. The student is then ready to try upon herself the effect of different positions. In order to make her realize that she cannot stand with her body straight and her toes turned out, she is asked to stand correctly, with her feet straight ahead, and weight forward, then to stiffen and hold her body in that position, and with weight still forward, turn her toes out. She is told to lock her knees strongly back, so that she may feel for herself the strain upon her legs and back which this position gives her. She is told to drop her neck forward and then lift it to correct position, in order that she may feel for herself the effect upon her chest and abdomen.

Beginning the exercise. After the students have been taught what is meant by correct posture and what changes must take place in their own bodies to obtain this posture, the exercises may be begun. The first exercise taught is Exercise I, Chapter VIII. As the first part of this has been taught in their first

explanatory lessons, the second part may be taken. Again let them find out for themselves the effect of posture upon their bodies. Let them relax into the position which they use when standing in line or waiting for a street car, assuring them that it is for no criticism on the instructor's part that they are asked to assume these positions, but in order that they may criticize themselves. Then ask each girl to think of her own body, to see if her shoulders are uneven, to discover in what position she is holding her hips and abdomen, and to give herself a general mental survey. Explain the effect upon the body of constant malposition of the hips and shoulders. Lastly instruct them in the correct way to relax. By demonstration, teach the correct method of sitting, and make them see the effect upon the instructor of a crouched position in the chair.

The next exercise taught is Exercise II, Chapter VIII, and this must be learned before they can begin another. It is essential that students should readjust the pelvis before going on to other posture work. As desired results depend upon muscle control, and this is a good exercise to use for this purpose, try to see that each student can freely contract her abdominal and glutei muscles before she tries any other work. As soon as Exercise II, Chapter VIII, is conquered, the student's card of exercise is given to her, and one by one each exercise is explained to her, the purpose for which it is given, and how it is to be taken to accomplish that purpose.

Teaching the reasons for correct posture. Try to make the student feel the importance of the correct



EXERCISES TAKEN BEFORE A MIRROR

use of her body, not only because of health, but because of its effect on her personal appearance and her condition of mind and spirit.

Exercises taken before a mirror. Most of the exercises, particularly the walking exercises, are done before a mirror, and the students are encouraged to study themselves with a critical eye. By this means they cannot only check up on their method of doing the exercise, but can discover for themselves any peculiarities of gait or carriage. As they work, these individual peculiarities are pointed out to them by the instructors and suggestions are made as to the best method of overcoming them. Walking exercises are given from the first not only that the students' bodies may be trained under supervision, but also that they may learn this one important thing which they can carry away with them and practice daily.

Corrective exercises should be slow. Corrective exercises should, as a rule, be taken slowly; each movement should be well controlled and carried out to a finish. Dr. John Mitchell says, in his book *Exercise for Remedial Purposes*, "In remedial movements to correct physical defects the chief value of the exercises will be lost if they are done too rapidly. The movements can scarcely be too slow." The students should have a definite consciousness of the muscles which are being used during the movement, and with most, if not all, exercises should voluntarily contract the muscles by power of concentration. This voluntary muscle control is difficult to obtain at first, and few who enter a gymnasium class have previously acquired it. But it should be considered the founda-

tion of corrective work, and no student should be permitted to proceed in her work until she has acquired this power to some degree. Slow work is necessary for this control, as each movement must be studied, not for its form, but for its muscle movement.

Reasons for some work in formal gymnastics. Toward the end of the winter's work it is well to introduce some marching and formal work for two reasons: first, so that the student may gradually be trained into doing rapid work while she exercises that control necessary to keep her body in correct posture; secondly, so that she may have some training in formal gymnastics before entering classes with others, who, having already had formal work, will be more advanced and less awkward than she.

CHAPTER VI

CORRECTIVE EXERCISES FOR SMALL CHILDREN AND OLDER PEOPLE

Poor posture of university students. It is a source of unending surprise to those who work in universities that so many students are allowed to reach the university age with their bodies in poor postural condition. Even when a student has come from a school where attention is given to sports and exercises, there has been, in almost every case, no instruction as to posture, or even as to correct standing position. It is advisable, after finishing a physical examination, to ask the student to show us how she stands when she is trying to look her best. If a girl fails to thrust her shoulders back, hollow her back, and otherwise distort her body, it is a matter of note and interest.

Instruction should be given in the elementary school. This condition should certainly be remedied. If, for example, proper physical instruction were given early in the child's life, there would be no need of months of work to correct deformities which are a result of months, or even years, of improper use of the body. Only such instruction and exercise would need to be given as seemed necessary to keep the student in good condition. Students in corrective classes are constantly saying, "Why was I not taught that

before?" And their instructors, too, wonder why. There are, indeed, many reasons why instruction and exercises for posture should be given in elementary and in high schools.

Children eager for information. To those unaccustomed to work with children, the method of instructional work for bodily correction seems difficult; but those who have tried it, find it practicable and interesting. A boy must be very young indeed not



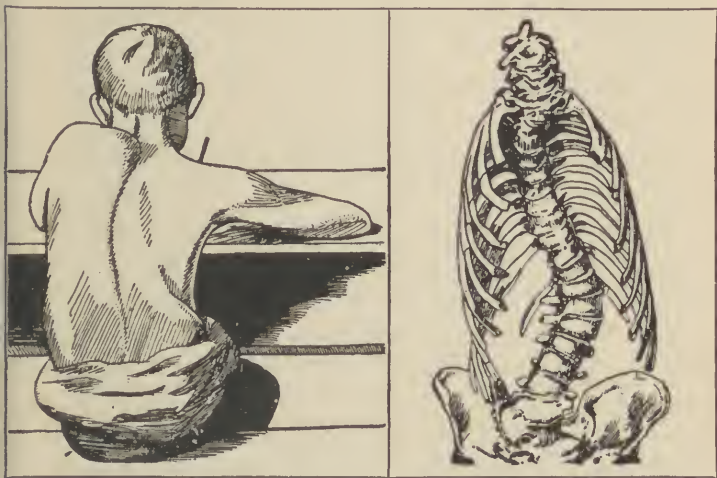
UNDESIRABLE SITTING POSTURE
CAUSED BY A CHAIR THAT IS TOO
LARGE

to have learned to make his biceps swell to show "how much muscle" he has; it is not difficult, therefore, to make him realize that he has other muscles which will swell in the same way. Girls, too, can be interested in muscles and exercise—even very little girls. For example, the desire to stand up straight and walk like a woman is easily aroused in them.

Children are, as a rule, eager for information. The facts about the working of their muscles, told to them in simple language, arouse their interest and fill them with an eager desire to try to do as they are told. Even the muscle charts are often interesting to them, and sometimes they take pride and pleasure in learning, quite unnecessarily, the long names of muscles pointed out to them.

Children's class hour. With children, the class hour should consist of some serious work followed by simple games, or, perhaps, easy climbing on stall bars and swinging on rings. Even this play can be used to develop the right muscles. Overfatigue should be avoided.

Keeping the child interested. By proper thought, one child working alone can be kept interested in the



EFFECT UPON THE SPINE OF A DESK THAT IS TOO HIGH

corrective type of exercise; and when there are two or three or more they can be made to look forward eagerly to the hour of their exercises. The mirror is a great help with the little ones, as well as with the older ones, particularly the double mirror in which they can see prominent shoulder blades, and abdomens, and hollow backs. They see for themselves that

they stand out in front and curve in at the back; hence, the mere suggestion of pulling in the abdomen and so pushing out the back gets a quick response in the improved position. It appeals to a child to be measured, to be urged to stand up tall and then see if he can hold that position in order that he may grow to be tall. To praise him for his efforts and point out to him their good results, spur him on to yet greater effort. Posture tests, also, and grading in posture are, of course, incentives. A contest of any kind interests a child, even if it is only to see if he can walk in a straight line toward a mirror keeping a small book placed on his head.

Overfatigue should be avoided. A child must not be tired by his work. Work that is too hard for him will not only do physical harm, but will cause him to come to the corrective class unwillingly, so that the results will not be what they should be.

Lessons learned in childhood remembered. Many lessons as to the position of the feet in standing and walking, as to bad results from letting the abdomen stand out too far or the head hang down, can be taught to a child so that they will make an indelible impression. The fact that shoes should give room for the toes may be taught at an early age. Do we not all remember facts of this type which were impressed upon us in our childhood? Sometimes, of course, the facts were not what they should have been, as, for example, the old-fashioned rule that the toes should be pointed out; but certain it is that these teachings, whether right or wrong, have remained with us and influenced us throughout our lives.

CARE OF THE FEET

From earliest infancy the little socks or shoes should not restrict the toes. Nature should be given the chance to shape the feet.

Children's feet

should go



Not in
like the duck's



Nor out
like the cormorant's

But straight like the Indian's

This will rest the weight of the body evenly on the soles and prevent "Flat Foot"

Do your child's
feet have to
fit his shoes?



or



Do your child's
shoes
fit his feet?

Two-thirds of his life will be spent in his shoes.
See that he has a proper footing for life.

AN EFFECTIVE POSTER TO INTEREST PARENTS IN THE CARE
OF CHILDREN'S FEET

Knowledge of correct posture important to children. Much stress is laid upon the instruction of children in regard to their teeth; and, while too much cannot be taught them about this matter, is not the knowledge of the correct use of their feet and their bodies just as important? Should not the parents,



American Posture League, Inc.

NOTE IMPROVEMENT IN THIS SCHOOLBOY'S READING POSITION BROUGHT ABOUT BY AN ADJUSTABLE BOOK REST

too, be taught to do their share? Should they not, for example, watch the children throughout the day to see that they do not sit in chairs that are unsuitable? We talk constantly about school seats, but how many parents think of providing chairs suitable for growing children? On the contrary, after little people outgrow their baby chairs, they are forced to sit in chairs built for adults; as a result, they sit on

the front of their chairs and lean back. The reason why this practice is so common among adults is undoubtedly that it was acquired during youth.

Corrective exercises for older people. Another field of corrective exercises which is usually neglected

is that for the older man and woman. According to ideas still prevalent, men and women of thirty whose posture is poor are often considered past the age when anything can be done to change their condition. Twenty-five, indeed, is often set as the final age at which results can be expected from such work. Pronated feet, it is true, are considered as possibly curable after that age, but treatment of this disorder is looked upon as "different."

We have a vivid memory of sitting in a classroom where the statement was made that "one should not expect to correct the posture after twenty-five," whereupon a student leaned toward us and said, "That finishes me. I was taking this course so that I could correct my body, and I am now twenty-seven." And upon other occasions when we have assigned women of thirty to the corrective classroom, they have told us that people laughed at them for thinking that they could change



TYPE OF INCORRECT SITTING POSTURE DEVELOPED BY USE OF CHAIRS THAT ARE TOO LARGE

their bodies at their age. It is true that bad structural changes in bones cannot be overcome; but this condition is found not only in older persons, but in children as well. We do not wish to seem to undervalue the importance of correcting posture in youth, for it is then a much easier task; and, naturally, if the poor postural condition is continued for any great length of time, bony changes may take place which will make it impossible to bring the body into perfect condition. But even if this preventive work has not been done and the bones and muscles have become somewhat changed, much can still be accomplished in most cases to bring the muscles, at least, into much better condition; and many have, by perseverance, so restored their bodies that it would almost take an expert to discover their deformities.

A case which came under our care a few years ago was that of a woman over thirty years of age who came into the class with great hesitance because she had been teased for thinking that she could help herself there. She was sensitive and nervous and had become so conscious of her awkward appearance and gait that her sensitiveness began to interfere with her work as a lecturer. She wore bad shoes; she had flat feet and large hips; and she walked most ungracefully. Finally, her very poor posture was accompanied by visceral ptosis, constipation, and painful menstruation. In the corrective classroom she was first taught to carry her feet correctly; she was, in addition, given foot exercises and instructed as to the type of shoe which she should wear. Then she was given posture exercises and exercises to reduce her hips, and she

was also criticized in regard to her method of walking. In class she worked faithfully and hard; she bought different shoes; she practiced walking in front of the mirror. She put in many extra hours at the work, and when she left the university at the end of the year she felt that she had been made over. She still seems to feel so; for she has written to a number of people telling them that her year at the university did wonders for her physically, that she has not lapsed into her former condition and never will.

Opinions of physicians. Dr. John Mitchell in his book, *Mechanotherapy and Physical Education*, says, "A few words and most important ones must be said on the immense value of exercise in later middle years and in old age." Dr. McKenzie, in *Exercise in Education and Medicine*, after giving a number of breathing and other exercises recommended by Sir Herman Weber to be used by those in advanced age, goes on to quote from this author: "By this movement we bring into action some of the muscles of the spine which are apt to be only imperfectly used by most persons in advanced age; and the stiffness of the neck and spine and the tendency to stooping so common in old persons can be to some degree corrected by this kind of movement." Again he quotes from the same source, "In addition to the influence on the circulation, the respiratory movements keep up the nutrition and efficiency of the lungs, which undergo in old age a kind of atrophy." And again, "Another important influence consists in maintaining the elasticity of the chest walls which are apt to become stiff in old age and thus to interfere with free movement of the lungs."

If exercise and exercises are important for those in "advanced age" and are useful for "correcting" their round shoulders and other defects, certainly we should not discourage those between thirty and forty who come to us hoping to improve their condition. We should, on the contrary, take infinite pains to examine them, prescribe exercises, and in every way aid and encourage them to develop better bodies.

Exercises should be suited to the age of the student. Exercises for both the very young and the middle-aged should be adapted to the age and physical condition of the one needing treatment. With both classes great care should be taken that individuals are not overworked — that they not only are not excessively fatigued at the time of their exercises, but that they do not feel unnatural fatigue between the class hours. With older people, of course, the play element is not essential as it is with children. What they do need, however, is careful oversight and clear instruction as to their defective condition, the causes for this condition, the results which may follow if the condition is not corrected, and the means which they can use in their daily life to assist in its improvement. For older people especial care should be taken to have the exercises so regulated that the heart will not be overtaxed. For instance, in making a schedule for a woman who is constantly occupied throughout the day, we ought so to regulate the work that she will feel refreshed, rather than overfatigued, by her exercises in the gymnasium.

Exercises by correspondence. Middle-aged and older people, feeling themselves unsuited to class

work, often attempt to correct their bodies by taking exercises by correspondence from persons who, while knowing nothing of them or the condition of their hearts and lungs, attempt to prescribe exercises which usually fail to correct the defect of body for which they are prescribed, if they do not cause positive injury. For instance, many of these "Schools" of exercises teach that, to be effectual, exercises must be self-resistive. This type of work is the most strenuous of all methods of exercising. As Dr. McKenzie says, "The stress put upon the circulation by this excessive contraction is great, and may overstrain a heart organically weak or encumbered by deposits of fat."

Another cause for the frequent failure of exercises taken by correspondence is the practical impossibility of their being executed correctly. A person who knows nothing of the muscles and their mechanics, nor of the technique of exercises, cannot be expected to understand the method by which the exercise should be done, nor the importance of doing it in the one proper way. We have known persons who, after having conscientiously taken exercises which have been assigned them from a school of this type, have become discouraged because they could see no good results and have put themselves under regular instructors. These instructors, using the same schedule of exercises, have corrected the defects for which the exercises had been originally prescribed.

Instructors in physical education should do all in their power to encourage those who consult them as to some defect of posture or other physical condition. The instructor should not only hold out the hope of

improvement, but should urge those needing help to put themselves under a skilled instructor, whenever that is possible, rather than to attempt to correct these defects by a course of exercises taken by correspondence.

CHAPTER VII

WHAT IS CORRECT POSTURE AND WHY IS IT NECESSARY?

Correct posture in 1842 and 1922. Not less interesting than the study of the growth in physical education for women is that of the changes that have taken place in the teachings of correct posture for women and how it is to be obtained. From the illustration here given, which was taken from a book written by C. H. Harrison in 1842 and published in England, it would seem that what was considered correct posture for women in those days was not at all what we of today think it should be. Contrast this illustration with the outline drawing of an "A" posture girl of today. We do not wonder that the "ladies" of those days suffered with many ailments and were rather given to fainting, nor that they needed tight corsets to hold up the abdominal organs, which were not supported by either the backbone or the abdominal muscles. Of course each generation believes its ideals are cor-



NORMAL POSTURE,
1842
From an old drawing.

rect, but certainly the posture resulting from a straight spine, strong abdominal muscles, and well poised body, is not only more beautiful, but also more healthy than the posture considered correct in 1842.

Fashion and posture. Fashion, no doubt, has much to do with posture. Sometimes it is considered "not the thing" for either men or women to keep their bodies erect. The edict of fashion is illustrated in the current magazines. These probably have great influence. But why incorrect postures are considered correct for illustrating styles we have never been able to understand.

Posture affected by ignorance. It is true that many women follow the dictates of fashion, even if they know that they are not making the best use of their bodies and may have to suffer because of so doing. Others, however, do not stand badly with intention, but as a consequence of not understanding either the importance of good posture or the way to acquire it. It seems to us therefore that it is the duty of those who understand these matters to do all in their power to teach those who do not, something of their bodies and the results of misusing them.

Posture work should be educational. To get the best results from posture work it should be made educational. Young people should be taught the structure of the body, the reason for its form, the function of the organs and the positions in which they can best do their work, the workings of the muscles and how to control them. They should be taught the effect upon the body of incorrect posture, the interference with the functioning of the organs if these are

allowed to sag out of place, the unnecessary fatigue caused by wrongly used muscles and imperfect circulation, the consequences of compressed and narrowed chest walls, and that crooked spines in their old age will be the result of unnecessary postural curves. Many will be hard to convince, for the young frequently live for the day and give no thought to the future, but a large per cent of those instructed will understand the value of correct posture and make an effort to acquire it.

Normal posture. The normal body is one which is held up at its full height, the weight upon the balls of the parallel feet, the head and chest well up, the shoulder blades flat upon the back, the costal angle from seventy to ninety degrees, the abdominal muscles strong, the abdomen flat at its lower part and fuller just below the ribs, the pelvis tilted at such an angle as to prevent an exaggeration of the lumbar curve, and the knees straight but not stiff. With the body in this position the thorax is full and round; the diaphragm is high; the abdominal viscera, except the lower portion of the colon, the sigmoid flexure, and part of the small intestines, are above the umbilicus; the stomach is pear shaped and lies on the left side partly under the ribs; the liver and intestines are in place; the pelvic organs are free from pressure from above and their blood supply is not interfered with.

Incorrect posture. When the body is held incorrectly the head and shoulders are forward, the weight is upon the wrong part; *i. e.*, the inside, of the outward turned feet; the knees are rotated inward; with an incorrect tilt of the pelvis, the lumbar curve is

increased and the sacroiliac joint is strained, the chest is lowered, and the lungs compressed; the costal angle is narrow; and, finally, the abdominal muscles being relaxed, the abdominal organs sag down so that they



(1)

(2)

TYPICAL POSTURAL DEFECTS

- (1) Forward curvature (lordosis).
- (2) Backward curvature (kyphosis).

do not function as they should and they press upon and interfere with the pelvic organs.

As a result of this malposition of the body there is a loss of efficiency. All over the body the muscles

are strained, and as they are working at a disadvantage they are easily fatigued. For example, the forward head and drooping shoulders strain the muscles in the back of the neck and the upper part of the back. The back is also strained in the lumbar and sacroiliac regions and the increased dorsal curve strains the in-



CORRECT AND INCORRECT SITTING POSITION

tervertebral ligaments and presses upon the nerves. The lungs work at a disadvantage because of their narrowed space; and, because the diaphragm is lowered and the abdominal muscles relaxed, the support for the abdominal organs is lessened and they sag out of place. The results are constipation, indigestion, and, frequently in women, menstrual disorders.

Finally, there is a loss of coördination and balance and a general feeling of fatigue and discouragement.

Correct posture in sitting and relaxed standing. Correct posture in sitting and relaxed standing should also be taught, for many hours spent in sitting incorrectly, or standing mainly on one foot with the body twisted out of shape, will cause grave postural defects. A full description of the correct methods of sitting and standing are given in Chapter VIII under Exercise I.

Best methods of teaching correct posture. Among instructors in posture work there is no one point upon which there is more disagreement than upon the proper orders for bringing a class into correct standing posture. Such orders as these are frequently given: "Heels together, weight forward, shoulders back, chest up, chin in, and head up." Such orders generally result in a chin drawn back in an unnatural position with the neck still out of line, shoulders thrust backward, and the weight on the heels—the result being a backward displacement of the trunk and an increased hollow in the back. In fact, experience shows that students who come for examination for, and correction of, poor posture almost invariably endeavor to correct their posture by thrusting their shoulders too far back and their chests unnecessarily high, but do nothing to bring their necks into line, to decrease the hollow in their backs, to correct the position of their feet, or to alter their faulty weight bearing. For this reason it seems best at first to ignore those parts of the body which the students are already inclined to overcorrect and to give the orders



(1)



(2)



(3)



(4)

FOUR DRAWINGS OF A STUDENT WHO SPENT THREE AND ONE HALF MONTHS IN A CORRECTIVE CLASS

- (1) Natural posture when she entered the class. (3) Natural posture after seven weeks of corrective work.
(2) "Best" posture when she entered the class. (4) Natural posture one year after leaving corrective class.

in such a way that they will get a different point of view. Correcting the position of the feet, swaying the body slightly forward from the heels up, stretching the spine, and pulling the abdomen in will in most cases correct (at least partly) the hollow back. Bringing the neck back in line with the spine and pushing up with the head, thus pulling upon the sterno-cleido



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(1)

(2)

(3)

THREE POSTURE VIEWS

- (1) Zigzag or fatigue posture. (2) Correct standing posture.
(3) Exaggerated standing posture.

muscles (the muscles between the back of the ears and the breastbone), will bring up the breastbone and so "raise the chest," without the backward swaying of the trunk or the thrusting backward of the shoulders.

There is nearly always a tendency among beginners in corrective exercise to hyperextend; *i. e.*, stiffen, the knees backward. Such a tendency is probably due to the severe effort that is being made. This incorrect position of the knees must be guarded against, as it not only increases the lumbar curve and makes the whole body stiff, but also frequently causes pain in the lumbar region and produces a general condition of fatigue. In correct position, the knees are not bent, but held in an easy position of slight extension. The knees should be watched also to see that there is no inward rotation. If this condition is present, instruction should be given as to the proper method of rotating them slightly outward, with exercises to strengthen the muscles which should hold the knees in correct position.

Typical postural defects. Typical anteroposterior postural defects are illustrated in the drawings on page 64. In forward curvature or *lordosis* there is an increase of the normal lumbar curve. In backward curvature or *kyphosis* there is an increase of the normal thoracic curve. These defects are very frequently combined. In flat back (not illustrated) there is a decrease of all the normal curves. Each of these types is accompanied by various related or resulting maladjustments.

CHAPTER VIII

POSTURE EXERCISES

Exercise I. Correct Posture.

PURPOSE. To teach correct posture when the student is standing (a) "at attention" and (b) relaxed.

(a) *Standing at Attention*

POSITION. Standing, with the feet straight, the knees straight and not too stiff, the weight on the balls of the feet, the body swayed slightly forward, the arms down at the sides, the abdomen drawn in, the trunk stretched as tall as possible, the neck held back and stretched up, the shoulder blades flat against the back, and the chin at such a level that if one were in front of a mirror one would look straight into one's own eyes.

POSSIBLE ERRORS. (1) Turning the toes out. (2) Thrusting the shoulders and upper trunk backward. (3) Resting the weight back on the heels. (4) Increasing the hollow in the back. (5) Not putting the neck back in line with the rest of the spine. (6) Pulling the chin too far in. (7) Raising the chest too high. (8) Overextending the knees backward. (9) Sagging in at the knees and allowing them to rotate inward.

(b) Standing Relaxed

POSITION. Standing relaxed, with the weight on one foot.

EXERCISE. With the body held stretched well up in good posture, sway toward that foot upon which the weight is to be thrown until the foot (the base of support) is in the middle of the body's weight. Lift the other foot and rest it lightly at the side or slightly in front of the body.

POSSIBLE ERRORS. (1) Allowing the body to relax too much at first. (2) Drooping the head forward. (3) Sagging down until the hips and shoulders are uneven.

Combining (a) and (b)

EXERCISE. (1) Correct standing at attention (a). (2) At ease (b). (3) Correct standing at attention. (4) Rest — the position in which the student has been accustomed to relax.

HINTS TO INSTRUCTOR. Exercise I(a) should be used frequently, being given before every standing or walking exercise, and no such exercise should be begun until the body is in good position; (b) is excellent to use before starting a balance exercise. This relaxed position is the whole secret of balance; that is, the middle of the weight should be over the base of support. It is well to teach a student to practice this until she can take the position naturally and quickly. Muscle control is the foundation of balance and coördination, and, therefore, of good posture. It follows that the students should be made to understand what muscles they are using in order to reach

good posture, and should be taught to control those muscles voluntarily. It is better to give ample time to Exercise I at first, even though progress seems slow. Later, when muscle control has been learned, improvement will be all the more rapid because of this instruction.

Exercise II. Wall Exercise.

PURPOSE. (1) To change the tilt of the pelvis—to bring the front of it up and the back down, and thus decrease the anteroposterior curve in the lumbar region. (2) To give the correct relative position of the trunk and pelvis. (3) To serve as an abdominal exercise.

POSITION. Standing, leaning against the wall, the feet straight and the heels a few inches from the wall.

EXERCISE. Push back at the waist line toward the wall. (This is done by contracting the abdominal muscles and the muscles in the back of the hips and thighs.) Holding the back in this position, draw the shoulder blades in and down, place the fingertips against the wall, and sway the body forward until the weight is upon the balls of the feet. Bring the head and neck into correct position.

POSSIBLE ERRORS. (1) Failing to contract the correct muscles. Raising the chest, holding the breath, and pressing the shoulders back against the wall in the effort to contract the abdominal muscles. (2) Increasing the lumbar curve. (3) Failing to change the position of the head and neck after swaying forward. (4) Bending the knees.

HINTS TO THE INSTRUCTOR. This is a difficult ex-

ercise for most beginners as it requires good muscle control, and the custom of tightening the abdominal muscles by lifting the chest or by filling the lungs is a very common one. Before the exercise can be properly executed this habit must be overcome. In "working up" to an exercise it is better not to put the body into an incorrect position as a means of reaching the required result by an indirect way. Many methods of reaching this position are taught. One is to bend the knees until the back touches the wall, then to extend them gradually while making an effort to hold the back against the wall. Another is to droop the head and shoulders and flex the knees until the back is close to the wall, then gradually extend the knees and bring up the head and shoulders. It does not seem a good plan to make the first step of an exercise one which throws the body into an incorrect position in the belief that the correctness of the last step will compensate for incorrectness of the first. As it is necessary for the student to be able to correct the position of her pelvis at any time and at any place, it is certainly better to teach the direct method of controlling these muscles.

This exercise should first be demonstrated to the student by the instructor. The student should place her hand against the wall, back of the instructor's lumbar curve. As the instructor contracts her muscles the student should feel that the spine is forced backward. Next, placing one hand on the instructor's abdomen and the other against her buttocks, the student feels the contraction of those muscles. She should then lean against the wall and endeavor to con-

tract her own muscles in the same way. If not successful the first time, the experiment should be repeated several times. If the student is still unable to make the correct movement, the instructor may push down upon the student's sacrum as she makes the effort, and thus help her to localize her pull. After assisting the student two or three times and pointing out the errors she is making, the instructor should leave her for a while to try it out for herself.

If this method is not a success the student should be told to lie flat upon her back and after she is thoroughly relaxed she should be directed to push down upon the instructor's hand, which has been placed under her waist. This, as a rule, is easy to do in this position. The movement should be repeated until it can be easily accomplished. It is then suggested to the student that as she makes the movement she shall try to realize what muscles she is using. As a rule the abdominal muscles are the first discovered, though sometimes even these are not observed unless the instructor places her hand upon the abdomen as the muscles are contracted. After this the student's attention is drawn to the tightening of the muscles in the back of her thighs and buttocks. She should then be directed to place her hands upon the anterosuperior spines of the ilium (the prominent part of the pelvis in front) and feel the movement upward of the pelvis. In this way she can be made to realize what she is doing and the means which she is using to accomplish the movement. If the contraction of the muscles in the buttocks cannot be made, the student should be told to turn over on her face and with the instructor's

assistance should contract the muscles, pulling in and down as the instructor pushes the muscles in the right direction.

When the exercise can be done in the supine position, the student endeavors to lean against the wall and try to move the same muscles, going from the table to the wall and back again as often as necessary until she can do the exercise freely in either position.

Sometimes there is such lack of coördination on the part of the student's muscles that it is necessary to abandon the wall exercise temporarily and begin with an exercise to develop a sense of muscle control. One which is generally used is that for abdominal contractions, given as Exercise XIX in Chapter IX.

The Wall Exercise is a very important one for the student to conquer as it ensures a position which she must be able to assume and hold at all times if she is to have good posture. Exerting the muscle control necessary to execute the exercise is also splendid practice, because direct muscle control is most necessary and often lacking in persons with poor posture. For this reason the exercise should be thoroughly taught and not abandoned until the student has conquered it.

Exercise III. Walking a Line.

PURPOSE. (1) To train the student to walk with the feet straight, the body in correct position and the weight thrown correctly upon the feet; (2) to serve as a balance exercise.

POSITION. Standing on a line in front of and leading to a mirror but some distance from it, with the body held correctly, feet straight, and the arms down at the sides.

EXERCISE. Walk forward toward the mirror, placing the front foot close against the toes of the rear foot and keeping the feet straight upon the line.

POSSIBLE ERRORS. (1) Incorrect posture of the body. (2) Turning the toes out. (3) Letting the feet pronate. (4) Failing to bring the heel of the forward foot close back against the rear foot. (5) Leaning the head over to watch the feet instead of looking into the mirror.

HINTS TO THE INSTRUCTOR. This exercise is an excellent one to use in training the student in the correct method of walking. The feet should be brought down correctly, the weight should be carried correctly, and careful attention should be paid to details. The exercise should be taken slowly and should not be continued after fatigue is making it difficult to hold the body correctly.

Exercise IV. Turkey Walk.

PURPOSE. To strengthen the muscles of the thighs, legs, and feet; to teach the proper use of the feet; and to improve the balance.

POSITION. Standing, with the body held correctly, in one of the following positions: (1) hands on hips, or (2) hands back of the neck, or (3) arms overhead, hands holding a wand.

EXERCISE. (a) Bring the knee well up with the leg straight down and the ankle flexed. (b) With the knee still up extend the leg and foot, pointing the toe. (c) Bring the foot to the floor, heel first, a moderate step in advance.

Repeat with the other foot and leg.

POSSIBLE ERRORS. (1) Thrusting the head forward. (2) Throwing the weight back on the heels. (3) Increasing the anteroposterior lumbar curve. (4) Turning the toes out. (5) Flexing the knee too much and holding the foot too far back. (6) Pointing the toes to the floor in (a). (7) Imperfect balance. (8) Making the step too long or too short. (9) Bringing the toes to the floor first.

HINTS TO THE INSTRUCTOR. An exercise of this kind should be given at first with the hands on the hips, as the arms-overhead position is apt to increase the lumbar curve, and make the balance more difficult. The student should understand thoroughly the method of obtaining good balance before attempting the exercise. It should be given slowly and good technique required from the beginning as the exercise is of little use unless executed correctly. The exercise may be given at first with the student standing still instead of walking forward, until the technique of leg lifting and balancing is acquired.

Exercise V. Walking Tiptoe.

PURPOSE. To increase balance, to exercise the feet, to stretch the body, and to train the student in maintaining correct posture under difficulties.

POSITION. Standing, with the arms down in front grasping a wand held horizontally, the heels turned out and the toes in.

EXERCISE. Rise to tiptoes, bring the arms overhead, and walk the line toward the mirror, taking small steps and putting the feet down one directly in front of the other.

POSSIBLE ERRORS. (1) Increasing the lumbar curve.

- (2) Failing to keep the heels out and the toes in.
- (3) Making the steps too long.

HINTS TO THE INSTRUCTOR. This exercise should not be given until the arms can be held overhead without increasing the lumbar curve. The exercise may be used for the feet by placing the hands upon the hips.

Exercise VI. Stretching.

PURPOSE. To stretch the spine with the body in correct position and to develop the muscles which should hold it in that position.

POSITION. Standing, with the hands on the hips.

EXERCISE. Push down on the hips and stretch the trunk as much as possible. Remove the hands and let the arms sink slowly to the side position and the shoulders to place, but keep the muscles in the trunk contracted so that the spine is held in the stretched position.

POSSIBLE ERRORS. (1) Losing the correct posture and balance. (2) Bringing the arms down too quickly. (3) Failing to keep the spine stretched and the trunk muscles contracted. (4) Throwing the weight back on the heels.

HINTS TO THE INSTRUCTOR. This exercise may be used as an individual exercise or with a class. If the arms are brought down too rapidly the trunk muscles relax and the whole effect of the exercise is lost. When giving an exercise of this type, care must be taken to see that the body is well balanced on the balls of the feet and that the trunk is stretched upward and forward. When using the exercise with an individual who is stiff or who has marked rotation of the spine,

the assistant can make the exercise more effective by placing her hands on the two sides of the student's trunk, thus helping her to stretch. The instructor's hands should not be removed until the student's arms and shoulders are in place. If there is either spinal rotation or much displacement, the instructor should direct the force of her push on that side of the student's body which will help her to correct those defects.

Exercise VII. Stretching.Exercise.

PURPOSE. Same as in Exercise VI.

POSITION. Standing, with the hands clasped on the top of the head.

EXERCISE. Stretch the body up, pulling down with the hands at the same time. Remove the hands slowly and bring down into position but keep the trunk muscles contracted.

POSSIBLE ERRORS. (1) Failing to keep the muscles of the trunk contracted. (2) Placing the hands too far back on the head.

HINTS TO THE INSTRUCTOR. Both this and Exercise VI may be taken sitting. Exercise VII can be used in place of Exercise VI to give variety. Or, as it is a little more difficult to hold the spine stretched while bringing the hands down from the head, it can be used to follow up Exercise VI.

Exercise VIII. Stretching.

PURPOSE. To relieve fatigue by stretching the whole body after a posture exercise.

POSITION. Standing in correct posture.

EXERCISE. (a) Raise the arms forward and upward and stretch. (b) Bring the arms down to shoulder height and stretch. (c) Bring the arms down at the sides and stretch. (d) Relax.

POSSIBLE ERRORS. (1) Failing to hold the correct body position throughout the exercise. (2) Keeping the arms uneven at the shoulders.

Exercise IX. For Standing Posture.

PURPOSE. To bring the body into correct balance and posture.

POSITION. Standing.

EXERCISE. Extend the arms at either side to shoulder level with the palms downward. Rise to tiptoes. Sink to the heels, keeping the arms extended. Slowly lower the arms.

POSSIBLE ERRORS. (1) Failing to keep correct posture. (2) Coming back with the weight on the heels.

HINT TO THE INSTRUCTOR. In addition to being a helpful exercise, this is also a good test for posture.

Exercise X. Correct Walking.

PURPOSE. To train in front of a mirror in the correct method of walking.

POSITION. Standing, with the hands down at the sides, the feet straight, the body swayed slightly forward.

EXERCISE. Bring the left foot forward, bend the knee, and slightly flex the ankle. Touch the floor lightly with the heel and throw the weight immediately upon the ball of the foot. As the left foot takes the weight of the body, bend the right knee and bring that foot up to the toes. Push off with the

toes, lift with the muscles of the thigh, bring the right leg forward, and come down with the heel first as was done with the left foot.

POSSIBLE ERRORS. (1) Putting the weight on the heels. (2) Turning the toes out. (3) Failing to keep



(1)

(2)

CORRECT WALKING

(Exercise X, Chapter VIII.)

(1) First movement. (2) Second movement.

the body in good posture. (4) Not bending the knees. (5) Not lifting with the thigh muscles. (6) Swaying the pelvis or trunk.

HINTS TO THE INSTRUCTOR. In slow walking on a level surface the thigh should move on the pelvis, the leg on the thigh, the foot on the leg, and the toes on the rest of the foot. All walking movements should be in an anteroposterior plane; there should be practically no swaying of the body nor tilting of the pelvis. The arms should sway naturally at the sides, the head be held up well, and the student should be able to walk without leaning over to watch the ground. This method of walking seems stiff at first, but after it has been practiced for a while it becomes natural and easy. It should be practiced slowly in front of a mirror and the student should watch her movements carefully to detect any idiosyncrasies of carriage, or in the use of her feet. Sometimes, when one has been in the habit of walking with the toes out, the tendency is to throw the toes out and bring them back, making a semicircle with one foot or with both feet.

CHAPTER IX

EXERCISES FOR FAULTY ANTEROPOSTERIOR CONDITIONS

Exercise I. For Faulty Anteroposterior Conditions.

PURPOSE. To exercise the muscles in the back of the neck and shoulders with the body placed in a position which makes it difficult to increase the lumbar curve.

POSITION. Half lying on a table or plinth, the feet on the floor, the trunk resting on the table, the head bent forward with the forehead on the table, the arms down and back, and the hands clasped.

EXERCISE. Keep the forehead down, the chin in, and (a) pull the head and the neck backward until the neck is in line with the rest of the spine; (b) pull down and back with the arms and contract the muscles between the shoulder blades; (c) contract the abdominal muscles; then (d) bring the trunk up to an upright position with the weight on the feet.

POSSIBLE ERRORS. (1) Raising the forehead and chin and rolling the head on the neck. (2) In doing (a) and (b), raising the trunk from the table by contracting the muscles of the spine. (3) Increasing the lumbar curve by failing to contract the abdominal muscles before raising the trunk from the table.

HINTS TO THE INSTRUCTOR. This exercise, if correctly given, is an excellent one for correcting a for-



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(3)

THREE EXERCISES

(1) Exercise I, Chapter IX. (2) Exercise VI, Chapter X. (3) Exercise X, Chapter X.

ward head and stooped shoulders, and for strengthening the muscles of the back. Parts (a) and (b) of the exercise should be given first in the order as they come. In these the student's trunk should rest upon the table so that the muscles of the back are completely relaxed. The movements should be made by voluntary contraction of the muscles of the back of the neck and the upper part of the back, while the muscles in front of the neck are also slightly contracted to make resistance against the movement. The muscles in the middle and lower part of the back should be relaxed so that there is no lifting of the trunk below the shoulder blades. The instructor should at first place her hand upon the student's back just below the point to which the muscle contraction is to be made, so that the student may learn not to contract her muscles below that point. After (a) and (b) can be correctly executed, (c) may be given; but this part of the exercise should be omitted until the student has sufficient control of her abdominal muscles to raise her body without increasing her lumbar curve.

Exercise II. For Faulty Anteroposterior Conditions.

PURPOSE. Same as in Exercise I.

POSITION. Sitting astride a stool, the arms down and back, the hands clasped behind, and the head forward with the chin resting on the chest.

EXERCISE. Pull down and back with the arms. Contract the muscles in the back of the neck and upper part of the back and pull the neck and shoulders back. Resist with the muscles in the front of the neck.

POSSIBLE ERRORS. (1) Raising the chin and forehead and rolling the head on the neck. (2) Bending the trunk backward and thus increasing hyperextension in the lumbar region.

HINTS TO THE INSTRUCTOR. This exercise, given to provide variety, is very much like Exercise I in its effect, but is not so good as that, as it is more difficult in this position to get a strong neck and shoulder exercise without increasing the lumbar curve.

Exercise III. Shoulder Exercise with Wand.

PURPOSE. To exercise the muscles at the back of the head and shoulders, and to stretch the chest muscles and the muscles at the back of the thighs.

POSITION. Sitting on the floor or on a plinth with the legs straight out in front, the body held erect, and the hands grasping a wand.

EXERCISE. (a) Raise the wand forward and upward, stretching well. (b) Bend the elbows and bring the wand back of the shoulder blades. (c) Return to first position.

POSSIBLE ERRORS. (1) Sitting with the knees bent and the shoulders drooped. (2) Dropping the head forward as the wand is carried backward.

HINTS TO THE INSTRUCTOR. In this position it is possible to give a strong shoulder exercise without causing increased lumbar curve. The exercise can be made more strenuous if the instructor will grasp the wand when it is overhead and give resistance as it is brought back of the shoulders, or if the student will slide her hands out toward the ends of the wand while it is held back of her shoulders.



SHOULDER EXERCISE WITH WAND
(Exercise III, Chapter IX.)

Exercise IV. Resistive Head Exercise 1 (Standing).

PURPOSE. Same as in Exercise I.

POSITION. Standing, facing the wall, with the arms extended and the hands braced against the wall. One hand of the instructor against the back of the student's head, the other hand in front on the abdomen.



RESISTIVE HEAD EXERCISE
(Exercise IV, Chapter IX.)

EXERCISE. Contract the abdominal muscles, stretch the body up straight, bend the head forward until the chin rests upon the chest. Push the head and neck backward against the resistance given by the instructor.

POSSIBLE ERRORS. (1) Bending the elbows as the hands rest upon the wall. (2) Pushing back with the shoulders and trunk. (3) Increasing the lumbar curve. (4) Raising the chin, thus rocking the head back. (5) Failing to push the neck back.

HINTS TO THE INSTRUCTOR. This exercise, as well as most of the neck exercises, should be done by contracting the muscles at the base of the neck and resisting slightly with the muscles of the front of the neck. The body must be kept erect, the abdominal muscles contracted. The resistance given by the instructor must be only heavy enough to increase the work of the muscle, not to retard it. As the strength of the muscle increases, the degree of resistance may be increased. The instructor's hand is placed in front of the student's abdomen so that any movement on the part of the student to thrust the abdomen forward may be detected.

Exercise V. Resistive Head Exercise 2 (Sitting).

PURPOSE. Same as in Exercise I.

POSITION. Sitting on a stool, facing the stall bars, and grasping the bars with the arms extended at shoulder height, the hand of the instructor against the back of the student's head.

EXERCISE. Same as in Exercise IV.

POSSIBLE ERRORS. (1) Raising the chin and rocking

the head on the neck. (2) Including the body in the movement.

HINTS TO THE INSTRUCTOR. The stool should be placed at that distance from the bar which will enable the student to have her arms straight out as she grasps the bar. Resistance should not be too heavy.

Exercise VI. Shoulder Exercise 1.

PURPOSE. To exercise the adductor muscles of the shoulders.

POSITION. Sitting astride a stool, with the arms stretching forward, palms in; the instructor standing back of the student, grasping her arms just below her elbows.

EXERCISE. Bring the arms backward to the horizontal side position against the resistance given by the instructor. Inhale as the arms go backward; exhale as they go forward.

POSSIBLE ERRORS. (1) Dropping the head forward. (2) Letting the shoulders stoop. (3) Raising the shoulders. (4) Dropping the arms below the height of the shoulders. (5) Increasing the lumbar curve.

Exercise VII. Shoulder Exercise 2 (Swimming).

PURPOSE. Same as in Exercise VI.

POSITION. Standing or sitting.

EXERCISE. (a) Thrust the arms forward with the palms in. (b) Turn the hands and bring the extended arms backward. (c) Bend the elbows and bring them in to the waist with the hands at the shoulders. (d) Repeat.

POSSIBLE ERRORS. (1) Dropping the head and

shoulders forward. (2) Too little vigor in the movement. (3) Increasing the lumbar curve.

Exercise VIII. Shoulder Exercise 3 (with Pulley Weights).

PURPOSE. Same as in Exercise VI.

POSITION. Standing facing the machine at full arm's length away.

EXERCISE. (a) Grasp the handles of the machine, stretching the body well up with the weight on the balls of the feet. (b) Flex the elbows and bring them down to the waist, turning the palms forward and bringing the hands to the outer side of the shoulders. (c) Back to first position. (d) Bring the extended arms down to the sides, the palms forward. (e) Back to place. (f) Bring the extended arms out at the sides, shoulder height, the palms forward. (g) Back to place. (h) Bring the extended arms overhead. (i) Back to place.

POSSIBLE ERRORS. (1) Letting the trunk sway backward thus increasing the lumbar curve. (2) Using the weight of the trunk to raise the pulley weights. (3) Dropping the head and shoulders forward.

HINTS TO THE INSTRUCTOR. Remember that to exercise the muscles of the back one should face the machine. For the chest muscles, one should stand with the back toward the machine. Unless the pulley weight exercises are used correctly they are injurious rather than beneficial. In order to exercise the muscles of the shoulders, the shoulder muscles must lift the weights. This is not done when the body sways backward and forward with each exercise. A common

mistake is to use too much weight; that is, weight that is too heavy for the shoulder and arm muscles; as a consequence, the trunk is swayed backward so that its weight may assist in the lift. The exercises should be begun with the lightest weight, and other weights should be added as they can be lifted. For the overhead exercise a very light weight is necessary.

Exercise IX. Chest Stretching 1.

PURPOSE. To stretch the pectoral muscles, force the shoulder blades back, and expand the chest.

POSITION. Sitting on a stool, the hands back of the neck, the elbows bent and held well back; the instructor standing with her foot on the stool back of the student, the instructor's knee against the student's back and her hands grasping the student's bent elbows.

EXERCISE. The instructor pulls the student's elbows back, down and around to first position and presses her knee into the student's back in order to stretch the pectoral muscles. The student must inhale as the arms come backward and exhale as they go forward.

POSSIBLE ERRORS. (1) Dropping the head forward. (2) Increasing the lumbar curve. (3) Rising from the stool as the muscles are stretched.

HINTS TO THE INSTRUCTOR. The degree of stretching accomplished depends upon the force used in pulling back the elbows and pushing in with the knee. This force should not be great enough to cause pain nor to force the student to rise from the seat. It is better to use only a little force at first and gradually to

increase it as the student's muscles become accustomed to the exercise.

Exercise X. Chest Stretching 2 (Corner Exercise).

PURPOSE. To stretch the pectoral muscles and to exercise the muscles of the abdomen, adductors of the



CHEST STRETCHING
(Exercise IX, Chapter IX.)

shoulder blades, and the muscles of the feet and legs.

POSITION. This exercise can be taken in the corner of a room or on upright bars in a gymnasium. Standing facing the corner, the feet straight and about

twelve inches from the wall, the body erect, the head up, and the abdominal muscles contracted. The hands, with the fingers pointing in, on the wall at the two sides of the corner and at what would be the height of the shoulders if student were standing on tiptoes.



CHEST STRETCHING
(Exercise X, Chapter IX.)

Note good position of child at right. Elbows of child at left are too low.

EXERCISE. (a) Rise to tiptoes and swing the trunk forward between the two hands, letting the elbows flex but keeping them at shoulder height. (b) Swing back and sink to the heels.

POSSIBLE ERRORS. (1) Dropping the head forward. (2) Relaxing the abdominal muscles. (3) Letting the back sink in at the lumbar region. (4) Changing the level of the elbows above or below shoulder height. (5) Turning the toes out.

HINTS TO THE INSTRUCTOR. This exercise may be taken with or without deep breathing. The severity of the exercise is regulated by the distance of the student's feet from the corner or the bars. If she complains of pain while doing the exercise she is not doing it correctly. Pain is caused by a sagging in of the lumbar region and this can be prevented by the contraction of the abdominal muscles. If these muscles are properly contracted, the exercise can be used even with a case of sacroiliac strain.

Give the exercise at first with the feet rather close up and give it only two or three times. As the student's muscles become accustomed to the work, increase the number of times it is given and by moving the feet back increase the severity of the exercise.

Exercise XI. Chest Stretching 3.

EXERCISE. An exercise using Lovett's apparatus for round shoulders. (For method and purpose, see *Lateral Curvature of the Spine and Round Shoulders*, by Robert W. Lovett, M.D.)

HINTS TO THE INSTRUCTOR. There are the same

objections to the use of this machine in a class in corrective gymnastics as there are to other stretching machines. (1) It makes the student conspicuous and self-conscious. (2) There is danger of stretching the muscles beyond the student's power of holding. The first objection can be overcome by a tactful presentation of the exercise. The apparatus can be used at first with those in the class whose condition is not sufficiently serious to make them sensitive. The other students may be allowed to watch those who are put into the apparatus, and they should be encouraged to ask questions. Any student who wishes to try the machine should be allowed to do so. The time lost is small in comparison to the good accomplished by the psychological effect upon the class. The second objection is lessened if the stretching is not given too vigorously at first, and it is done away with if the student is first trained to hold her body at its best.

Exercise XII. Shoulder Exercises for Two Students.

PURPOSE. To add resistance to shoulder exercise and to provide variety.

POSITION. Standing back to back, or facing, arms extended overhead, both students grasping a wand with both hands.

EXERCISE. (a) Swing the arms down at one side; bend the elbow at that side, one student resisting as the arms are brought down. (b) Bring the arms back to place without resistance. (c) Swing down on the other side with resistance. (d) Back to place without resistance. (e) Repeat, second student resisting.

POSSIBLE ERRORS. (1) Failing to hold the trunk erect as the arms are swung down. (2) Too much or too little resistance. (3) Failing to bend the elbows.

Exercise XIII. For Shoulder and Back.

PURPOSE. To strengthen muscles of back and stretch pectoral muscles.

POSITION. (1) Standing, with the body erect and hands resting on the hips. (2) Standing, with the trunk bending forward and the hands on the hips.

EXERCISE. (a) Bring the arms up with the elbows bent and the hands back of the neck. (b) Bring the arms down with the elbows at the waist and the thumbs at the shoulders. (c) Stretch the arms overhead with the palms in. (d) Bring the arms down with the elbows at the waist and the thumbs at the shoulder.

Repeat the series.

POSSIBLE ERRORS. (1) Failing to bring the elbows well in at the waist. (2) Bringing hands to incorrect position. (3) Dropping the head and shoulders forward. (4) Increasing the lumbar curve. (5) Failing to keep the trunk in a correct position with the weight forward.

HINTS TO THE INSTRUCTOR. This series of arm exercises and others which may be used to give variety and some differences in the effect, may be used not only in the two positions of the trunk indicated but in others, such as in prone lying on the table, or with the trunk over the end of the table, or sitting on a stool or plinth with the feet fastened down and the trunk slightly inclined backward. They must be given care-

fully and the student thoroughly instructed in the correct use of her trunk in the different positions so that she will not increase any faulty conditions of posture which she may have.

Exercise XIV. For the Back of the Neck, the Shoulders, and Back.

PURPOSE. To teach control of and to exercise the neck and shoulder muscles.

POSITION. Standing, with the arms down at the sides, the body held in correct position, and the abdominal muscles well contracted.

EXERCISE. (*a*) Drop the head and neck forward until the chin rests upon the chest. (*b*) Contract the muscles at the base of the neck and upper part of the back until the head is erect and the neck in line with the spine. (*c*) Shrug both shoulders upward and contract the muscles in the back between the shoulder blades. (*d*) Contract the muscles in the back just below the shoulder blades so as to pull the shoulders down, but at the same time resist the movement by a slight contraction of the muscles on top of the shoulders.

POSSIBLE ERRORS. (1) Rocking the head on the neck and thus failing to bring the neck back into the correct position. (2) Dropping the shoulders instead of drawing them down with the muscles. (3) Increasing the lumbar curve by failing to keep the abdominal muscles contracted.

HINTS TO THE INSTRUCTOR. This exercise, like all of those in which voluntary muscle control is necessary, is difficult at first. It should not be used until

the student can control her abdominal muscles and gluteal muscles. After she has learned to contract those muscles voluntarily, the difficulties in this exercise, with a little patience on the part of the instructor, can easily be overcome.

Exercise XV. For the Muscles of the Back.

PURPOSE. To exercise the muscles of the back, particularly in the lumbar and sacral regions.

POSITION. Sitting on a stool, with the hands on the hips, the instructor's hand in the middle of the student's back.

EXERCISE. Bend the trunk well forward; then come back against resistance.

POSSIBLE ERRORS. (1) Dropping the head and shoulders forward. (2) Letting the whole trunk sag until the back is round.

HINTS TO THE INSTRUCTOR. This exercise can be used to good effect with cases of sacroiliac strain, but must be given carefully. If there is pain in the back, it is best to give the exercise at first without resistance and repeat it only a few times. When it can be taken without pain or soreness, begin using the lightest possible resistance. If there is still no pain, increase the number of times of giving the exercise and the degree of resistance. If there is a marked increase in pain or soreness after taking this or any other back exercise, it should be recognized as an indication of too heavy work; and the number of times of giving and the force used in resisting should be decreased. Sometimes it is best to omit the exercise for a day or two until the soreness has disappeared.

and the student has become less nervous. Then it may be given again and given lightly.

Exercise XVI. Abdominal Exercise 1 (Standing).

PURPOSE. To strengthen the abdominal muscles, to reduce the abdomen, and to stimulate the intestines.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Raise the extended leg forward and upward, alternating. (b) Raise the leg with the knee bent, straighten the leg and lower it to place, alternating, right and left. (c) Lift the bent knee with the foot back, extend the leg forward with the foot extended, and bring the foot quickly to the floor a short step forward. (d) With the knee bent and the foot extended, raise the leg and replace, alternating right and left.

POSSIBLE ERRORS. (1) Failing to keep the body in good position. (2) Letting the weight go back upon the heels and dropping the head forward. (3) Swaying the body from side to side.

HINTS TO THE INSTRUCTOR. These exercises affect the abdominal muscles only slightly. They are useful in beginning abdominal work after an operation. They can be given in place, or walking forward. If (c) is given in place, the foot should be brought down to the original position instead of taking a step forward. All these exercises can be given slowly or rapidly.

Exercise XVII. Abdominal Exercise 2 (Hanging).

PURPOSE. Same as in Exercise XVI.

POSITION. Hanging on the stall bars or boom, with the hands even.

EXERCISE. (a) Bend the knees up, one at a time, alternating; then lower to place. Repeat with both legs at once. (b) Bend the knees up one at a time, straighten the leg, and sink to place. Repeat with both legs together.

POSSIBLE ERRORS. (1) Wrong position of the hands. (2) Letting the body sag down on the arms. (3) Dropping the head forward.

HINTS TO THE INSTRUCTOR. It is best, when giving a hanging exercise, to let the student become accustomed to the hanging position before giving the leg or trunk exercises. The hands should grasp the bar underneath, with the backs of the hands toward the wall, in these exercises. The hands should be well apart and there should be enough muscular contraction in the arms and back of the shoulders to help to bear the weight of the body and to keep it from sagging down on the hands and arms. This method of giving a hanging exercise is perhaps more difficult, but the effect upon the shoulders and chest is much better.

Exercise XVIII. Abdominal Exercise 3 (Lying on the Back).

PURPOSE. Same as in Exercise XVI.

POSITION. Lying on the back on a plinth or mat, with the arms stretched over the head or the hands back of the neck, on the hips, or down at the sides.

EXERCISE. (a) Bring the extended leg up as high as possible, bend the knee, and lower the leg to place. (b) Bring the leg up with the knee bent, straighten the leg, and lower it to place. (c) Bring the straight leg up and then lower it to place.

POSSIBLE ERRORS. (1) Hollowing the back as the legs approach the mat in coming down. (2) Letting the trunk be lifted by the weight of the legs. (3) Failing to keep the legs in the desired positions.

HINTS TO THE INSTRUCTOR. In movements (a), (b), and (c), if the back hollows as the legs approach to about twelve inches from the table, have the student drop her legs at that point. At this angle the abdominal muscles pull very little and the iliopsoas muscles (muscles between the lower part of the spine and the thighs), which are attached to the lumbar vertebræ, come into play. It is always best to avoid an exercise that causes an increase in the lumbar curve.

Exercise XIX. Abdominal Exercise 4 (Contraction and Relaxation).

PURPOSE. To strengthen the abdominal muscles, to reduce the abdomen, and to make the first step toward voluntary muscle control.

POSITION. Lying on the back, with the hands clasped across the abdomen.

EXERCISE. Contract and relax the abdominal muscles without using the respiratory muscles. Begin slowly and later increase the speed of the contractions. Count mentally and endeavor to increase the number of movements each time of taking the exercise.

POSSIBLE ERRORS. (1) Contracting and expanding the abdomen with the inhalations and exhalations. (2) Contracting and expanding the abdomen by raising and lowering the chest. (3) Holding the breath during the exercise.

HINTS TO THE INSTRUCTOR. Many persons find it

difficult to contract the abdominal muscles voluntarily. When they first try to do so, they raise the chest with a strong inhalation or force their shoulders backward and their chests up. They lack the power of moving separately the muscles of the abdomen and those of the chest and shoulders. As voluntary muscle control is a very important part of corrective gymnastics, and it is impossible to obtain the best posture if the abdominal muscles are relaxed, this exercise may be used for the first lesson in muscle control. Proceed in this way: (1) Place the student upon her back and see that she relaxes all over. (2) With one of her hands upon her abdomen, one under her lumbar region, direct her to contract her abdominal muscles. If the movement that she makes is that of pushing back with her shoulders or taking a deep breath, she can feel with her hands that the movements have neither contracted her abdominal muscles nor flattened her lumbar spine. (3) After she has learned not to make use of incorrect movements, direct her to fill her lungs moderately full and hold her breath while she tries to push her abdomen out against, and to draw it away from, her hand. Continue this counting to see how many times it can be done before the breath must be relaxed. (4) As the next step, have her fill her lungs and, as she contracts and relaxes her abdominal muscles, whistle or blow out the air from her lungs. This she should practice until she can blow steadily while her muscles contract and relax. (5) Have her talk as she takes the exercise, and practice this until her breath is not interrupted by the movement. (6) Have her breathe naturally, counting

inwardly and continuing the exercise until forced by muscle fatigue to stop.

Exercise XX. Abdominal Exercise 5.

PURPOSE. To strengthen the abdominal muscles.

POSITION. Lying on the back, with the feet fastened down, (1) hands on the hips, (2) arms crossed over the chest, (3) elbows bent and hands back of the neck.

EXERCISE. Raise the trunk up to a sitting position from each of the three positions indicated.

POSSIBLE ERRORS. (1) Dropping the head forward. (2) Contracting the chest by bringing the shoulders forward.

HINTS TO THE INSTRUCTOR. This exercise should be given first with the feet fastened down; later, when the student's abdominal muscles are stronger and her muscle control is increased, it can be given with the feet free. The position of the arms may be changed to increase the difficulty of the exercise. The student should not be allowed to contract her chest when she raises the trunk, but should be assisted by the instructor until her abdominal muscles are strong enough to let her keep her trunk in the correct position as she comes up. If this exercise is too difficult, the instructor may support the body while it goes backward and the muscles are being used in eccentric movement, and let the student bring the body upright in the concentric movement of the muscles.

Exercise XXI. Abdominal Exercise 6.

PURPOSE. To strengthen the abdominal muscles.

POSITION. Sitting on a stool, with the toes caught

under the stall bars, the elbows bent, and the hands back of the neck.

EXERCISE. Incline the body backward, then return to the upright position.

POSSIBLE ERRORS. Dropping the head and elbows forward and contracting the chest.

HINTS TO THE INSTRUCTOR. The amount of work in this exercise depends upon the angle into which the trunk is inclined in the first movement. In this exercise, as in the preceding, if the work at first is too heavy the head and shoulders fall into an incorrect position; so it is best to begin with slight inclination backward until the muscles are strong enough to raise the body correctly. As all muscles work best when contracting, if the muscles are very weak it is better at first to support the student's trunk as it is carried backward.

CHAPTER X

EXERCISES FOR A SINGLE CURVE

Lateral curvature of the spine. Lateral curvature of the spine, or scoliosis, produces deviations in the framework of the body such as uneven shoulders and unequal hips. The person so afflicted usually regards his lack of symmetry as a first condition and does not realize that the real cause of the defect lies in the spine.

A curve is termed "cervical," "dorsal," or "lumbar" according to the part of the spine in which the convexity is located and "left" or "right" according to the direction of the convexity.

A "postural" or "total" curve is a deviation of the spine to the left or right for its entire length. (For an illustration, see page 12.) Such a deviation is commonly to the left. For this reason the following exercises have been written for a left total curve. *For a right curve, the exercises should be reversed.*

Shoulder Exercises

PURPOSE OF THE EXERCISES. To stretch the muscles on the right side of the trunk, to raise the right shoulder, and to lower the left.

Exercise I.

POSITION. Standing, with the hands on the hips.

EXERCISE. Stretch the left arm down at the side and push down hard.

POSSIBLE ERRORS. (1) Bending the body toward the left side. (2) Failing to keep the body well poised.

Exercise II.

POSITION. Standing, facing the stall bars.

EXERCISE. Stretch the left arm forward and grasp the opposite stall bar. Raise the right arm overhead and stretch.

Exercise III.

POSITION. (1) Sitting astride a stool. (2) Standing, with the feet slightly apart.

EXERCISE. Place the right hand back of the neck, the left hand well up against the ribs. Bend to the left and push in with the left hand.

POSSIBLE ERRORS. (1) Letting the right elbow come forward. (2) Placing the left hand too low. (3) Bending to the right side. (4) Failing to keep the body well poised.

HINT TO THE INSTRUCTOR. To affect the curve in the dorsal region, the trunk should be inclined forward in Exercise III.

*Shoulder and Hip Exercises***Exercise IV.**

PURPOSE. To exercise the muscles which raise the right shoulder, the abductors of the left leg, and the left abdominal and lower back muscles.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Raise the right arm forward, upward, and overhead; the left arm sideward to shoulder height. (b) Rise on tiptoes. (c) Lift the left leg sideward and stretch the whole body. (d) Back to position.

Exercise V.

PURPOSE. To stretch the spine and raise the right shoulder.

POSITION; EXERCISE. Hanging on the stall bars with the face toward the bars and the right arm high.

Exercise VI.

PURPOSE. To stretch the high shoulder down, the low hip up, to stretch the muscles between the two, and to straighten the spine.

POSITION. Facing the stall bars, the right hand grasping the top bar, the left hand the second bar, the feet resting on a stool or lower bar.

EXERCISE. Hang down on the arms and stretch the right leg over the side of the stool or bar. [See (2), page 84.]

Exercise VII.

PURPOSE. To stretch the low shoulder up, to stretch the spine, and to exercise the muscles of the low hip.

POSITION. Hanging with the right arm high.

EXERCISE. Raise the legs toward the left.

Exercise VIII.

PURPOSE. To stretch the spine and right shoulder and exercise the muscles of the left hip.

POSITION. Hanging with the back to the stall bars with the right arm high.

EXERCISE. Bend and raise the left knee.

Exercise IX.

PURPOSE. To correct the spine by pressure with the hands ("self correction").

POSITION. Standing, with the hands on the hips.

EXERCISE. Stretch the right arm up overhead and press the left hand against the ribs at the point which forces the spine into the best position.

HINTS TO THE INSTRUCTOR. Stand behind the student, watch the effect upon her uncovered back, and so place her hands that she will correct the curvature. This exercise can be given with all types of lateral curvature if the hands are correctly placed.

Exercise X.

PURPOSE. To stretch the muscles between the right hip and shoulder.



EXERCISE VII (CHAPTER X), TAKEN FOR A LOW LEFT SHOULDER AND LOW RIGHT HIP



TO STRETCH THE MUSCLES BETWEEN THE RIGHT HIP AND SHOULDER
(Exercise X, Chapter X.)

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Charge forward with the left foot. (b) Keep the right foot back and turned so that the sole rests on the floor. (c) Raise the right arm forward and upward. (d) Stretch the left arm back. [See (3), page 84.] (e) Hold and stretch. Repeat.

POSSIBLE ERRORS. (1) Failing to bend the left knee. (2) Letting the right foot rise from the floor. (3) Incorrect position of the trunk. (4) Dropping the head.

HINTS TO THE INSTRUCTOR. This exercise must be given in the correct fall-out position, with the trunk in a line with the rear leg. Keeping the sole of the right foot on the floor, pulls down the right hip. This is also a good exercise for strengthening the foot.

Exercise XI.

PURPOSE; POSITION. Same as in Exercise X.

EXERCISE. (a) Charge forward with the left foot. (b) Turn the right foot and keep it on the floor. (c) Raise the right arm forward and upward. (d) Stretch the left arm down and back. Stretch well; then (e) bend forward and touch the floor with the right hand as far out in front of the left foot as can be reached. (See page 112.)

POSSIBLE ERRORS. (1-4) Same as in Exercise X. (5) Bringing the hand too close to the left foot, and so allowing the body to relax. (See page 113.)

HINTS TO INSTRUCTOR. This exercise is very much like the preceding one, but the final stretch to touch the floor makes it more difficult. Give Exercise X first, and when that can be easily done, give this one.

Exercise XII.

PURPOSE. Same as Exercise X.

POSITION. Sitting on a stool, with the hands on the hips.

EXERCISE. Stretch the right leg back of the stool,



EXERCISE XI (CHAPTER X) CORRECTLY DONE

resting the foot on the toes. Stretch the right arm up and the left arm back. The trunk should be on a line with the right leg.

POSSIBLE ERRORS. (1) Making a mistake in the leg

to go back or the arm up. (2) Incorrect position of the trunk.

Exercise XIII.

PURPOSE. To raise the right shoulder and lower the right hip.



EXERCISE XI (CHAPTER X) INCORRECTLY DONE

POSITION. Lying on the back on a plinth with the right knee bent over the end, the left knee bent and the left foot on the plinth; the left arm under the back; the right arm bent with the elbow at the waist.

EXERCISE. The instructor must grasp the wrist of the student's right arm and pull it sideways and up while the student resists. When the arm is up, the student must relax and the instructor stretch as she counts five. The student should then bring the arm down to the first position while the instructor resists.

Exercise XIV.

PURPOSE. To straighten the spinal curve.

POSITION. Lying on the plinth on the concave right side, with the right arm under the head.

EXERCISE. Lift the left leg up sideways.

CHAPTER XI

EXERCISES FOR A DOUBLE CURVE

A double spinal curve. When a case of scoliosis exhibits more than one curve the upper one is mentioned first in describing the condition. The exercises given below are written for a typical case of right dorsal, left lumbar scoliosis. *For the opposite curves the exercises should be reversed.*

The person striving to correct either a single or a double curve should bear in mind the desirability of supplementing the exercises by assuming, when at rest, such a reclining position as will help toward the desired correction.

Exercise I.

PURPOSE. To raise the low shoulder.

POSITION. Sitting on a stool, with the hands on the hips.

EXERCISE. Raise the left arm sideways and up and stretch.

Exercise II.

PURPOSE. To raise the low shoulder and lower the high hip.

POSITION. Standing, with the hands on the hips.

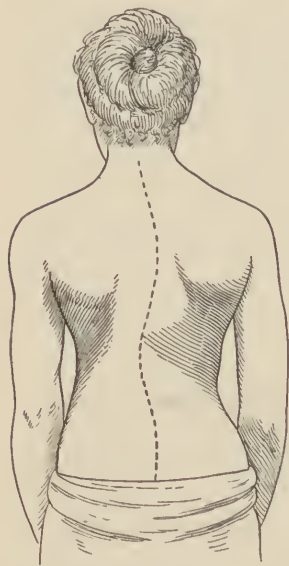
EXERCISE. Raise the left arm and the left leg sideways and stretch.

Exercise III.

PURPOSE. To raise the left shoulder and the left hip.

POSITION. Lying on the back on a plinth or mat.

EXERCISE. Raise the left arm forward and upward beside the head, and the left leg up and stretch.



A CASE OF RIGHT DORSAL,
LEFT LUMBAR SCOLIOSIS

The dotted line follows the
spine.

Exercise IV.

PURPOSE. To correct the curves by pressure with the hands.

POSITION. Standing.

EXERCISE. Place the hands on the convexity of the spinal curves. Push in and at the same time stretch the trunk well up.

POSSIBLE ERRORS. (1) Failing to place the hands correctly. (2) Not keeping the body in good posture.

HINTS TO THE INSTRUCTOR. Exercise IV should be studied out by the instructor on the student's bare back until the right position for the hands is found. The instructor can help the student in stretching

and make the exercise more forcible by placing her hands over those of the student and pushing.

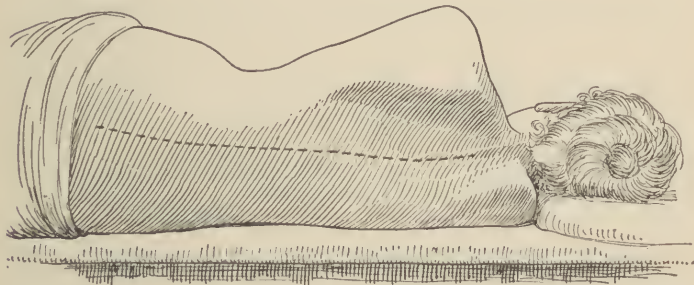
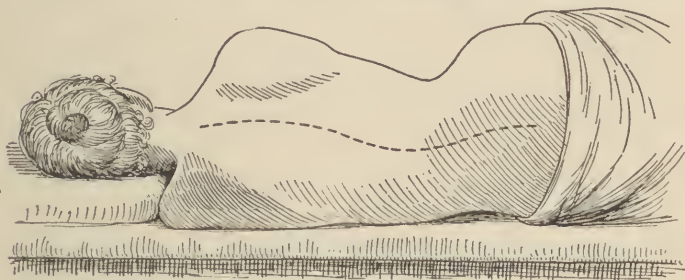
Exercise V.

PURPOSE. To straighten the dorsal curve.

POSITION. Standing, with the arms back, the hands clasped, and the pelvis held by an assistant.

EXERCISE. Bend the trunk forward, roll the shoulders back, pull back and sideways with the hands, and twist the trunk to the right.

POSSIBLE ERRORS. (1) Dropping the head and



NOTE THE CORRECTIVE EFFECT OF SLEEPING UPON THE RIGHT SIDE
IN A CASE OF RIGHT DORSAL, LEFT LUMBAR SCOLIOSIS

shoulders forward. (2) Failing to keep the pelvis fixed.

HINTS TO THE INSTRUCTOR. When an exercise for side bending to affect the spine is given, the pelvis must be fixed, as otherwise the hips and legs take part

in the twist and the exercise has little effect upon the spine.

Exercise VI.

PURPOSE. To straighten the lumbar curve.

POSITION. Lying on the back on a plinth.

EXERCISE. Raise the right leg to about a foot from the plinth and hold.

POSSIBLE ERROR. Not raising the leg to the correct height.

HINTS TO THE INSTRUCTOR. In this exercise the foot should be raised to the point where the iliopsoas muscle (the muscle between the lumbar vertebræ and the thigh) will work, and the abdominal muscles relax. This point may vary with different persons; so, in giving the exercise at first, have the student raise both legs and bring them down slowly until she feels a pull on the lumbar region. At this point the greater part of the weight of the legs is thrown upon the iliopsoas muscles, the angle being too great for the abdominal muscles. When both legs are at this point in their descent, the pull on the two sides of the lumbar vertebræ brings them forward and increases the lumbar curve. With only one leg lifted the vertebræ are drawn to the side. If the weight of the leg alone is not enough, a heavy dumb-bell or other weight may be suspended from the student's ankle.

Exercise VII.

PURPOSE. To straighten the lumbar curve.

POSITION. Sitting on a plinth with the legs over

the sides, the feet in the stirrups, and the hands back of the neck.

EXERCISE. Bend to the left.

POSSIBLE ERROR. Failing to keep the body in the correct posture.

HINTS TO THE INSTRUCTOR. This exercise can be made more forceful if the assistant, after placing one hand on the left convexity of the spinal curve and the other hand on the opposite shoulder, will push in with the hand on the left curve and pull over with the hand on the shoulder.

Exercise VIII.

PURPOSE. To straighten the lumbar curve.

POSITION. Lying face down on a plinth, with the hands on the hips.

EXERCISE. Raise the body up and bend to the left.

Exercise IX.

PURPOSE. To stretch the spine and raise the left shoulder.

EXERCISE. Hanging on the stall bars or rings with the left hand high.

Exercise X.

PURPOSE. To straighten the dorsal curve and decrease rotation.

POSITION. Half lying on a plinth, the trunk over the end, the hands resting on a stool, and the feet fastened down.

EXERCISE. Place the hands on the hips, lower the trunk below the level of the plinth, and twist to the right.

POSSIBLE ERROR. Letting the head and shoulders droop.

HINTS TO THE INSTRUCTOR. This exercise seems at first quite difficult, so that it is best to stand by the student the first few times she does it or until she becomes accustomed to it. If resistance and pressure are given by the assistant, the exercise is made more forceful.

Exercise XI.

PURPOSE. To stretch the whole body, to bring up the low shoulder, to lower the high hip, and to straighten the spine.

POSITION. Standing, with the hands on the hips.

EXERCISE. Charge forward with the left foot (the knee bent), keeping the right foot back and turned so that the sole is on the floor. Bring the left arm up, the right arm down, and stretch.

Exercise XII.

EXERCISE. Same as above, but add the following movement: Stretch the left arm well up, bend the trunk, and touch the floor with the left hand as far out in front of the right foot as can be reached.

POSSIBLE ERRORS; HINTS TO THE INSTRUCTOR. See Chapter X, Exercise X.

Exercise XIII.

PURPOSE. Same as in Exercise XI.

POSITION. Sitting on a stool, with the hands on the hips.

EXERCISE. Stretch the right leg back of the stool, resting the foot on the toes. Incline the trunk in line

with rear leg. Stretch the left arm up, the right arm back, and stretch the whole body.

POSSIBLE ERRORS. (1) Keeping the trunk upright, thus increasing the lumbar curve. (2) Dropping the head and shoulders. (3) Making a mistake in the movement of the arms.

Exercise XIV.

PURPOSE. To raise a low left shoulder and to straighten the spine.

POSITION. Lying on the back on a plinth with the right knee over the end, the left knee bent and the foot resting on the plinth, the right arm under the back, the left arm overhead and grasped at the wrist by the assistant.

EXERCISE. Pull the left arm forward and down against the resistance of the assistant.

Exercise XV.

PURPOSE. To stretch spine and raise a low left hip.



TO STRETCH THE SPINE AND RAISE THE
LEFT HIP

(Exercise XV, Chapter XI.)

POSITION. Hanging on stall bars with the hands even.

EXERCISE. Raise the legs toward the left by contracting the muscles on that side of the trunk.

CHAPTER XII

FLAT FOOT: ITS CAUSE AND TREATMENT

Importance of preventing flat feet. There is no work in corrective gymnastics more important than that of the prevention and treatment of flat feet. Many students who enter gymnasium classes have weak feet. That their feet have never given them trouble is no indication that the muscles are normal, for many students have never in any way tested the strength of their feet. They have done only ordinary walking, and have not gone for long tramps or taken up heavy sports. Since such students are not accustomed to exercising in gymnasium shoes, the change from shoes with high heels added to the effort to do much more strenuous physical work than they have done before, puts a very severe strain upon their feet. Therefore, to take up gymnastic or any heavy work without strengthening the muscles of the feet or learning to use them correctly is unwise, since the unwonted exercise strains these muscles and is very likely to cause flat feet.

The feet of all new students should be examined. All entering students should have their feet thoroughly examined. If there are even slight symptoms of pronation, if the feet are being used incorrectly, or if the shoes are very bad, the students should be given the

instruction and treatment necessary to prevent them from developing foot troubles.

Treatment should be educational. The treatment of weak feet is largely educational. This educational work should include instruction as to the formation of the foot itself. The lessons should deal with the bony structure; the articulations and the part that these play in the movements of the feet; the muscles, their position and functions. This instruction should be given with a skeleton and a muscle chart, so that the student may see for herself the formation of the foot



SKELETON OF FOOT

and the position of the muscles. While this instruction is being given, each movement should be demonstrated by the instructor and executed

by the student, both being either in their stocking feet or, when advisable, barefooted. (See page 37.)

After studying the formation of the foot, the student should be taught the correct use of the feet. The effect upon the feet of carrying the toes pointed out should be taught; and, for demonstration, the bones of the foot and leg, the muscle chart, the foot of the instructor, and that of the student should be used. In the same way she should be taught the effect of walking with the feet straight and the difference in effect resulting from carrying the weight upon the heel and upon the ball of the foot. When this demonstration is given, the influence upon the posture of the body of straight feet and correctly borne weight should also be pointed out. Finally, the correct

method of walking should be demonstrated by the instructor and practiced by the student.

The terms used should be understood. The student should be taught the movements of the feet, such as supination, pronation, etc. She should have explained to her the meaning of the terms used in speaking of flat feet, and should be taught to recognize the symptoms of flat feet, the causes of these conditions, and the results of not correcting them.

The student should be taught to recognize correct shoes. The next most important subject to be taken up is the matter of shoes. Upon the days when shoes are to be discussed, it is an excellent plan to have the students wear their street shoes into the class. This is not that the shoes may be criticized, for the psychological effect of such criticism is not always good; it is, however, for the purpose of enabling the students themselves to compare their own shoes with the shoes which are being demonstrated, and to use their own judgment in deciding whether their shoes meet the requirements laid down by the instructor. Frequently students will ask for a discussion of the shoes that they are wearing, expressing a desire for constructive criticism. It is then permissible to point out to them the effect upon their feet of undesirable shoes; their attention can be drawn to the visible impression of



SOLE OF FOOT

Note muscles and tendons that bend the toes and support the arch.

bent toes upon a soft shoe and to the fact that, in some cases, the feet have spread over the soles because the sole is too small for the foot. The effect upon the feet of small shoes made of leather too heavy to stretch should also be pointed out.

Material for demonstration. The material for demonstration during these talks should be as follows:

- (1) shoes of all types — those with inflare, outflare, straight, long and narrow, short and broad soles, low heels and round toes, high heels and pointed toes; (2) pictures and charts showing the position of the bones of the foot when in a correct shoe, in an over-narrow shoe, and in a shoe that is too short; (3) the bones of the foot and leg. In order to be of service to the student, the instructor should know where correct shoes can be bought; for inability to find the right sort of footwear is one of the principal reasons why women wear poor shoes. Many of the stores do not



POSITION IN WALKING

The feet should not be turned out in this manner.

carry correct shoes; and, since they want to sell their stock, they either persuade the customer that it is impossible to find shoes of the type which she wishes or that her feet, being different from those of other people, do not require "sensible" shoes. Now it is only natural to think that a man who is specializing in shoes must know more about them than anybody else, so both men and women will many times

take the salesman's word, against their own opinion. Perhaps some day those who sell shoes will realize their responsibility and be unwilling to recommend shoes that do not fit.

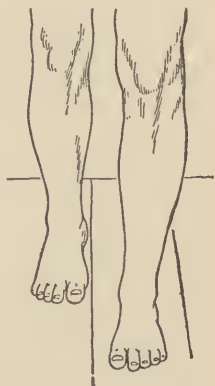
Reasons why women do not wear better shoes.

It is very difficult to induce women to wear shoes that do not injure and deform their feet. How the custom of wearing improper shoes ever became so universal is a cause for wonder.

It is true, perhaps, that the foot looks smaller in the deforming type of shoe; and at one time it was considered as necessary for women's feet to appear small as for their waists to be tiny, regardless of what injurious means were used to attain that result. The present generation has, of course, reached the point where women can laugh at the style in dress of their grandmothers and wonder how they could think tiny waists beautiful and how they could endure the discomfort of squeezing the body into an unnatural shape. We can only hope that some day it will also seem as strange to women that a preceding generation should have squeezed and deformed its feet.

As a matter of fact, there are several reasons for the reluctance that women show to changing the common type of shoes. Among these are the following:

(1) Custom and fashion demand that to be "well



POSITION IN WALKING

The feet should be held parallel to each other.

dressed" a woman must wear high-heeled, narrow-toed shoes. She is conspicuous in a larger shoe, except when wearing sport clothes.

(2) It is impossible to buy an evening shoe of any but the type indicated above.

(3) Many of the so-called "common sense" shoes are anything but sensible so far as the ordinary foot is concerned, giving as much discomfort as more fashionable shoes, if not more.

(4) Women as a rule do not understand why the narrow shoe is injurious nor recognize a good shoe when they find it, and they are not helped by the shoemakers so to understand.

(5) Many women have tried to change from high heels to low, with resulting discomfort, not realizing that an intermediate change is necessary, so that the muscles of the feet and legs may become gradually accustomed to the difference in position.

Demands of custom and fashion. To solve the first difficulty it will be necessary to do two things: to change the fashion in evening shoes — an innovation which may come but slowly — and to convince women of the inappropriateness of wearing with street costume a shoe of the same style as that which they would wear with evening dress.

Difficulty in buying correct shoes. The second difficulty will never be met until shoemakers consent to make shoes of fine soft materials, suitable for evening wear, but of correct shape. For this state of affairs it is not just to hold the shoe dealers entirely responsible. They must provide shoes that the public will wear; and until women meet them at least half way,

they cannot afford to stock up with different shoes. This difficulty will probably be met as that of the walking shoe is being met. Since the demand for better shoes has been growing, the supply has gradually increased, slowly and with apparent reluctance on the part of the shoe dealers, but fast enough to indicate the changes that are coming.

First type of "common sense" shoe. The first reaction against the small narrow shoe resulted in the "common sense" shoe, which was really an imitation of a man's shoe and was planned along the same lines. The characteristics of "common sense" shoes were as follows: flat heels, wide toes, no support under the arch of the foot, sizes that were too large, and leather that was not suited to a delicate skin. Most of the women who tried to wear these shoes had, as a result, more trouble with their feet than they had ever experienced before. The change from high heels to flat ones strained the muscles of the feet and legs and in many cases started flat feet. The feet slipped forward in shoes that were much too big and that did not support the arch; as a result, there was pressure upon the ends of the toes, causing *hallux valgus* (displacement of the great toe) and other toe deformities. In addition, the heavy leather rubbed and blistered the feet. Thus the woman who had sacrificed her pride to wear shoes that were supposed to keep her feet comfortable, made up her mind that either such shoes were *not* sensible or that her feet were different from those of others, and that she would, in future, wear the high heels and narrow toes to which she was accustomed. Fortunately, the old type of "common

sense" shoe is rapidly disappearing, and a better shoe is taking its place. Each year more and more women are learning that it is possible to be fitted with shoes which, though following the natural outlines of the feet, are not too heavy nor too flat and big — that the feet can present a trim, neat appearance in shoes that

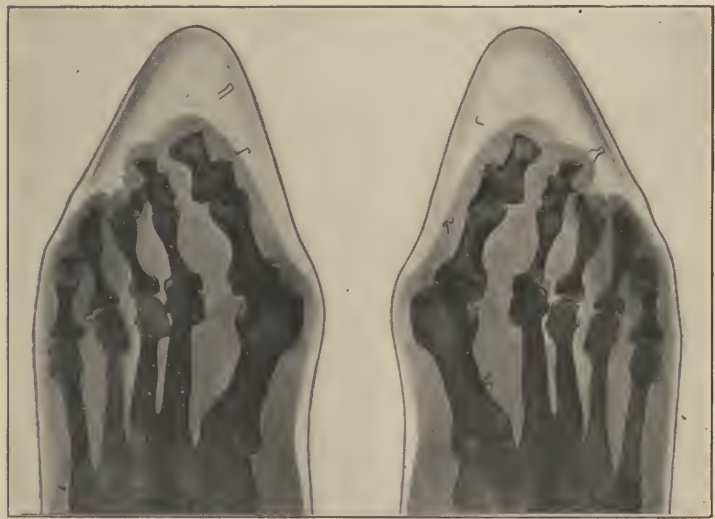


X-RAY PICTURE OF FEET IN PROPERLY FITTING SHOES

have neither French heels nor narrow, pointed toes.

Women entirely ignorant about shoes. Most women do not understand the points which should be considered in buying a shoe. They know nothing of the formation of the feet, of the effects upon the

feet of shoes that are too small, what causes a corn or bunion, or why the arches of their feet become weak and painful. They hardly associate these conditions with their shoes; or, if they do, they leave it entirely to the salesman to tell them what type of shoe they ought to buy in order to prevent or cure these conditions. Perhaps they buy arch supports and a longer



X-RAY PICTURE OF FEET IN IMPROPERLY FITTING SHOES

shoe; perhaps they have their feet treated by a chiropodist, and, feeling temporary relief and not understanding the serious conditions that may develop, see no need of changing the shape or style of their shoes. To meet this ignorance, two things are necessary: education of wearers of improper shoes, and education of the shoe salesman, not only in regard to

feet, the correct lines of shoes, and the evil effects of unsuitable arch supports, but also as to the grave responsibility which is his. Just as it is frequently the dressmaker who realizes the beginning of uneven shoulders and hips, it is the shoe salesman who, in most cases, is first to note and be consulted about foot troubles. Hence, if he does not make an effort to provide shoes that really fit — shoes that will prevent bad foot conditions — or if he does not impress upon his customers the necessity for consulting an orthopedic surgeon so that weakened feet may be cured before their condition becomes serious, he is evading his responsibility.

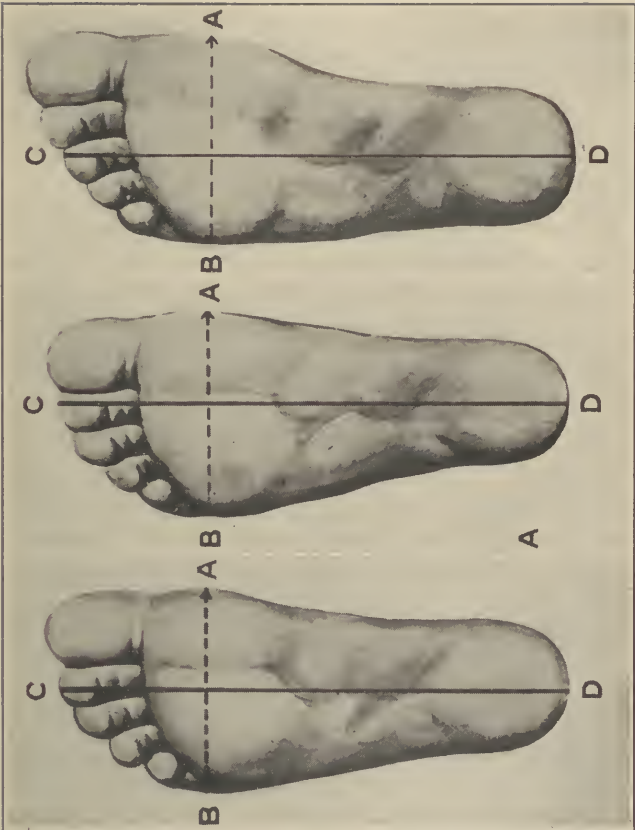
Effect upon the feet of high-heeled and narrow-toed shoes. A high heel crowds the foot forward into the shoe, causing the toes to be cramped against the end and narrow sides of the shoe, so that the greater part of the body weight, instead of being borne on the ball, comes on the inside of the foot. Furthermore, since a small high heel does not properly support the weight, the ankle twists and turns as the weight is thrown upon it. With heels too high, the knees are held in partial flexion and are not used correctly in walking. Finally, when the foot is too far forward and the knees too much bent, it is impossible to hold the body in correct posture. The narrow-toed shoe is the cause of still other disorders. In the first place, compressing and distorting the toes of the foot as it does, it causes them to bend and overlap. This bending of the toes forces the joints out of position and against the sides of the shoe, in which position the toes are rubbed at the joints so that corns and bunions

are formed. Again, since the toes, compressed and distorted, are not able to move, the muscles controlling them become so weakened from lack of use that finally a fallen anterior arch is the result. In addition, the joints of the toes are forced out of position, the muscles are strained, and the nerves pinched at the joints. And since, with the front part of the foot held motionless, it is most difficult to walk with the feet straight forward, the toes are turned out more and more, while the inward rotation of the knees is increased. With the feet turned out, the weight of the body is thrown on the lateral arch, the muscles of which, unexercised and unable to bear the unnatural weight thrown upon them, become strained and weak. The result is flat feet.

Effects of making a sudden change in height of heels. One of the causes of flat feet that is given by many orthopedic surgeons is a sudden change from tight, high-heeled shoes to broad, low-heeled shoes. The muscles of the leg have, up to the moment of change, been held in a shortened position and have therefore contracted to take up the sag. Similar changes have taken place in the muscles of the feet. If the support of the high heel is suddenly removed and the muscles put into a stretched position, the result is that they are so stretched and strained that the feet and legs become weak and painful. The sufferer is therefore convinced that it was a mistake to change from high heels. If, however, the change had been made gradually, and the muscles of the feet and legs stretched with exercises, the results would have been good instead of evil.

Points to be considered in fitting shoes. A properly fitting shoe must have the shape of the foot upon which it is to be worn. The old idea that all shoes must have a straight last is rapidly changing. Now it is known that there are at least three types of feet: the inflare, the outflare, and the straight. If an inflare shoe is fitted to an outflare foot, the consequences can only be disastrous, for an inflare shoe does not give room for the little toes of the outflare foot, nor will a straight last fit either the inflare or the outflare foot. There are many varieties of each of the three types of feet. Among these are the long, narrow foot with long toes and either a high lateral arch, or a low long arch; the short, broad foot with short toes and high or low lateral arch; the foot with small narrow heel or big broad heel; and the foot with narrow heel and broad anterior, or wide heel and narrow anterior.

To fit all feet with one style of "correct" shoe is, as can readily be seen, an absolute impossibility. Here again the knowledge and responsibility of the shoe salesman comes in; he should be able to recognize a foot that is not of the type to be fitted by the shoes which he handles, and his sense of responsibility and good salesmanship should be such as to make him tell his customer not to buy from him, but to go where the right type is to be found. It is becoming the custom to give names to the special types of shoes; hence, those who treat weak feet should learn the various shapes and names of these shoes and be able not only to instruct their students or patients as to the correct type of shoe for their feet, but also to give them the special name of the shoe that they need.



Churchill and Alden Company

(3)

(2)

(1)

THREE TYPES OF FEET

(1) Straight. (2) Outflare. (3) Inflare.

The shoe must fit closely in the heel in order that the foot shall not slip up and down. It must fit the lateral arch. If the arch in the shoe is too high it presses unnecessarily upon the foot; if it is too low it does not give sufficient support. The arch should be long enough, but not too long, as the continuation of the lift in the arch of the shoe beyond that in the foot causes the leather to press upon the joint of the great toe and may inflame or blister the joint. The vamp of the shoe should be neither too long nor too short, for if the vamp of the shoe rubs the foot it may blister and inflame the foot and cause permanent injury to the muscles and tendons of the toes.

The shoe should be of correct length. It should, of course, be long enough to extend well beyond the ends of the toes, but a shoe which is so long that it does not fit in such places as the arch and vamp is not a well-fitting shoe. Many people buy their shoes long with the idea that they can, in this way, wear a narrow, pointed toe without injury. It may be possible to do so if there are no other complications; but care must be taken to see that the shoe is long enough for the toes to have room to spread, that the vamp and arch are suitable to the foot, and that the high heel is not causing the foot to slip down into the shoe until the toes are as close to the end of the shoe as they would be if the shoe were too short.

Flexible shaft. Many people advocate a flexible shaft in a shoe. In theory, or for a perfectly normal foot, the lack of support of the flexible shaft may do no harm, particularly if the heel is low. With a very weak foot, however, this lack of support does make

a difference. Such shoes, therefore, are not always advisable, nor are they best for stout persons. These shoes frequently give just in front of the heel of the shoe, forcing the heel slightly backward and hence straining the muscles of the foot at that point.

Weight of the shoe must be suitable. The weight of the leather should also be considered. It should be light for warm weather and for wearing in the house and heavier for cold weather or for walking, particularly for walking over rough ground. Another consideration is that, whereas some people can wear heavy leather without tiring or blistering their feet, others, under the same conditions of weather and surroundings, find heavy leather impossible. Leather must, therefore, be suitable to the skin and endurance of the individual. This, of course, does not mean that thin kid and suede shoes or slippers should be worn out of doors during the winter or in rain and snowstorms, for such shoes are meant chiefly for house wear.

Wearing oxfords in winter. Oxfords and other low shoes were undoubtedly intended for summer wear, and in many ways they seem more appropriate to that season. But there is no reason why they cannot be worn in winter if the ankle is protected by woolen stockings or by spats which shed water, since the main purpose of the high boot for winter use is to protect the ankle. Unfortunately, there are always some who, when imitating a custom of this kind, fail to realize the importance of paying attention to the sensible side of the matter. Adopting the custom of wearing low shoes during the winter, these people,

instead of protecting the ankles as they should, wear thin silk stockings out of doors, or frequently instead of oxfords wear thin suede and kid slippers. To do so indicates a lack of judgment and often results in colds and more severe illnesses.

Wearing arch supports. One point which is much neglected in the education of people with weak feet is instructing them as to the weakening effect of arch supports upon the feet. In every gymnasium in which weak feet are treated, some are found, even among young girls, who, for longer or shorter periods, have worn arch supports. Unfortunately, this time often extends into years before the discovery is made that their feet are being injured by the use of these. Such supports are most often, though not always, given to them by shoe fitters; but, of course, there are many suffering from tired and painful feet who, seeing arch supports advertised, or hearing of some one who is using them, voluntarily buy and wear them, little guessing the evil effects the use may have upon the muscles and ligaments of the feet. Such statements as the following are common:

"I had a pair of shoes that hurt me, but the salesman told me that I could wear the shoes if I would use a pair of supports in them."

"My feet used to get very tired, so I bought these in a shoe store. They seemed to help at first, but sometimes now I feel as if they had made my feet worse."

"One of my insteps hurt and a friend told me that arch supports would help me. As they sell them in pairs, and I had to buy two, I just used them both."

"I had flat feet, and as the advertisement said that the arches would cure flat feet, I bought them. But I can't say that I think they cure, for my feet are very weak still."

After a corrective class has been told what very undesirable conditions are likely to follow the use of arch supports unless the feet are treated at the same time, many students will admit that what has been described as the result of a protracted use of arch supports is just what has occurred in their particular cases.

In view of this, does it not seem that the promiscuous sale of arch supports should be forbidden? The fact that they are often injurious is well known — especially the arch support that does not fit. And why should shoe salesmen and chiropodists be allowed to prescribe this particular splint, whether useful or injurious, when they would not be allowed to apply splints for any other injury or disease? Is flat foot such a minor ailment that those suffering from it do not need protection from the untrained practitioner? Even now, however, there is one way to protect people against the improper use of these supports, and that is to educate them in the use and abuse of this form of treatment.

Benefits to be derived from arch supports. Primarily, arch supports are intended to assist, temporarily, the arches of a foot in which the muscles, so weak that they are no longer able to give the necessary support, are being further strained by the weight which they are not able to carry. In the second place, arch supports are useful in relieving the pain that so

frequently accompanies this strain upon the muscles. In the third place, the supports hold the bones of the foot in place, so that the muscles, no longer strained, have a better chance to recover their tone. While the arch support is being worn, the foot should be regularly exercised so that the support may eventually be dispensed with altogether.

Injurious effects of arch supports. The pressure of



X-RAY PICTURE OF ANKLE AND BONY
ARCH

the arch support against the muscles of the foot, unless the muscles are being exercised in some special way, interferes with the circulation and the play of the muscles and finally so increases muscle weakness as to cause atrophy. A support which does not fit throws the foot into an un-

natural position and does not help in any way to correct muscle weakness.

An arch support should fit. The arch supports which are put on the market for general sale are not adapted to individual feet. Furthermore, many of these supports are made of steel, a material which yields very little when the weight is put on the feet. The least injurious of the ready-made arches are probably those made of leather or rubber; but as these do not give so much support as the steel arches, many

consider them less satisfactory. As to the shape of these ready-made supports, they are made in the various sizes of the shoes, but the differences in the height or length of the lateral arch, or any other individual characteristics, are not considered. Few people seem to realize that, to be of any benefit, an arch support should be made for the one who is to use it, and that the making and fitting of it should be done only by a specialist who thoroughly understands such work. Arch supports should be prescribed by nobody but an orthopedic surgeon; and after they are made, he should fit them himself in order to see that they are absolutely right. Most orthopedic surgeons themselves take the impression of the feet in plaster, prepare casts for the instrument maker, cause the latter to make, from these casts, supports in some soft material, and then mold and fit these supports to the feet of their patients until satisfied that they are correct. Finally, they have these carefully fitted supports copied in steel or some other firm material.

Getting accustomed to and leaving off arch supports. Those who are just beginning to wear arch supports should wear them first in the house, and even there for only a short period at a time. If they are worn a long time without rest, the pressure upon the foot is often most uncomfortable, sometimes even painful. After they have been worn for a while in the house, they may be worn outside, but at first on short walks only. When the wearer has really become accustomed to them, they may, of course, be worn continuously. The same care must be taken in leaving them off. They should first be left off for short

periods in the house, then for short walks. Finally, they may be left off entirely, or used only if the feet are very tired. If dispensed with too suddenly, the muscles of the feet and legs may become so strained as to be very painful.

Causes of flat feet. The causes of flat feet are as follows: incorrect shoes; incorrect use of the feet, such as pointing out the toes, with, as a consequence, the weight thrown too much on the lateral arches and a



POSITION OF THE BONES OF THE FOOT WHEN
NO HEEL IS WORN ON SHOE

restricted use of the muscles; constant standing, as in the case of nurses, bank clerks, and policemen; excessive weight, particularly if it be gained rapidly; ill health, resulting in general

muscular weakness; too radical a change in the height of heels; injury from jumping in the gymnasium or during games; unaccustomed exercise, such as in long tramps.

Examination of the feet. A student should be examined in a standing position, with the feet uncovered. The first point to be considered is the position of the foot, whether it is straight or pronated, and if pronated, to what degree. The easiest way to determine this is to examine the feet from behind. In the normal foot, correctly held, the *tendo Achillis* forms a straight line down to the heel. If the foot is pro-

nated, the tendon turns out at the lower end. The sagging down and in at the ankle of the pronated foot can also be seen. Next determine the degree of sagging which has taken place in the lateral arch. To do this the foot must be examined first without, and then with, the weight upon it. All feet flatten to some degree as the body weight is put upon them, but a weak foot flattens too much. The next step in the examination is to have the student walk first from and then toward the instructor so that the manner in which the feet are used may be seen and also whether the ankles bend in as she walks. The toes should be noticed, for crooked bent toes are an



POSITION OF THE BONES OF THE FOOT
WHEN A HIGH HEEL IS WORN

almost infallible indication of a flat anterior arch. The feet must also be examined for calluses and corns, as a callus under the anterior part of the foot is another symptom of flat anterior arch (see page 146), while calluses at the sides of the feet show faulty weight bearing and improper shoes. Corns also indicate improper shoes. The appearance of the muscles should be noted, to see if they are flabby or swollen. The student should be questioned as to pain or weakness in the feet or ankles and as to tendency to cramps in the legs or feet or severe sprains in the ankles.

The knees must also be examined. When the feet are used correctly, the patella is directly in line with the feet; that is, a plumb line dropped from the anterior crest of the ilium will pass through the middle of the patella and between the two inner toes or just inside the great toe. When the feet are turned outward the knees turn out, too, for the knees and feet normally point the same way; but when the feet have been carried incorrectly until they become weakened



REAR VIEWS, SHOWING (1) PRONATED FEET AND INCORRECT LINE OF TENDO ACHILLIS, (2) NATURAL FEET AND CORRECT LINE OF TENDO ACHILLIS

and pronated, a change also takes place in the knees and they gradually return to the forward position. As the knees rotate in, the tibia and fibula (bones of the leg), pressing upon the astragalus (the bone in the foot upon which the leg bone rests), turn it slightly in its socket and press it in and down. The outward rotators in the thighs become somewhat elongated and

the relative positions of the knees and feet are changed, so that if the feet are placed parallel the knees are rotated inward, but if the outward rotators of the knees are contracted, the centers of the knees are brought to the front, the inner borders of the feet are lifted, and a large part of the pronation is corrected. For this reason, it is very important, when treating the feet, to teach the student to keep the outward



(1)

(2)

NOTE, (1) INCORRECT POSITION OF KNEES AND FEET, (2) CORRECT POSITION OF KNEES AND FEET

rotators of her knees contracted as much as possible and to give her exercises to strengthen these muscles.

Treatment of weak feet. An important part of the treatment of weak feet consists of exercises, for it is by this means that we can restore strength to the weakened muscles. Such exercises should, of course, be given under supervision. In a corrective gymnasium it is

much better to have all foot exercises taken in a class which is under the direct supervision of the instructor in charge. With flat feet, one of the defects to be overcome is perverted muscle sense with a resulting loss of muscle control. This defect makes it difficult to execute exercises with correct technique. The instructor must, therefore, watch the students' feet closely as the exercises are performed, stopping an exercise at the least deviation from the correct movement.



A CALLUS UNDER THE ANTERIOR PART OF THE FOOT IS A SYMPTOM OF A FLAT ANTERIOR ARCH

A second reason for this class supervision is that the amount of work done must be regulated. As a rule, muscle soreness after exercise is not a serious condition, but muscle soreness after foot exercises is undesirable; for, while soreness in those muscles which are only occasionally used makes but little difference, in

the case of the feet, which must be used constantly throughout the day, soreness in the muscles will fatigue the whole body. The exercises, therefore, should at first be few in number and of a mild degree. As the feet strengthen, the number and nature of the exercises may be changed. Through the entire course of treatment, the condition of the feet between the class

hours should be carefully considered in order that the effect of the exercises upon the student may be properly gauged. Again, if, during the class hour, a student complains of unusual fatigue, or of cramps in the muscles of her feet or legs, she should be allowed to stop and rest while the class finishes the exercise. Finally, when a student understands the correct way in which the exercises should be done as well as the importance of doing them correctly, she should be asked to practice them daily in her home — but certainly not until she can do them correctly without supervision.

Stimulating the muscles with baths. To alternate hot and cold baths is one of the most effectual means of stimulating the muscles and relieving pain and fatigue. These baths are taken in the following manner: Fill a pail or bowl, or a small tub, with hot water and set it inside the bathtub. Then, while sitting on the side of the tub, turn on the cold water faucet, so that the foot can first be held under the cold water, then dipped into the hot water. Alternate this process from fifteen to twenty times, letting the feet stay in the cold water until they feel cold and in the hot water until they are hot. If it is more convenient, two tubs or pails may be used, one filled with hot water, one with cold.

This type of bath is of much greater benefit than a simple hot bath; for, while hot water relaxes the muscles and expands the small blood vessels, with the alternation of cold and hot, there is first a contraction, then an expansion, so that the walls of the small

blood vessels are really exercised and the circulation increased. By means of this improved circulation the muscles are stimulated and the pain is lessened.

Massage for the feet. Massage is helpful in strengthening the muscles in the feet and legs and to decrease muscle soreness and fatigue.

Strapping the feet. Pain and fatigue may be relieved by strapping the feet with adhesive plaster. If the feet are in a serious condition, or if there has been an accident or injury, this strapping should be



STRAPPED ANTERIOR ARCHES
AND BUNION PROTECTED BY
ADHESIVE PLASTER

done only by a surgeon. If the feet are merely weak and are being treated by an instructor in physical education, simple strappings may be applied. For the lateral arch, adhesive plaster may be used in the following manner: Start at the inner border of the tibia, well above the ankle; bring the strap

over the front of the ankle and the external malleolus, then carry it down under the foot, just in front of the heel, to the internal malleolus; at this point, carry it across in front of the ankle and attach the end of the plaster to the outer side of the leg. For pain in the anterior arch a two-inch strap may be adjusted as follows: Starting on top of the foot, put the strap of adhesive plaster around just below the joint of the great toe; carry it under the foot and up below the joint of the little toe, drawing it rather closely and fastening it on top of the foot so that there is a gap

between the last end and the first; if necessary, a second strap, slightly overlapping the ends of the first strap, may be put on further up toward the ankle.

Treatment of calluses, corns, and bunions. Calluses, corns, and bunions may be protected by adhesive plaster in the following manner: Cut a round or oblong piece of adhesive plaster according to the part that is to be protected. Cut a hole in the plaster just large enough to allow the part to be protected to protrude. Apply two or three, or even four, pieces of the plaster, building it up to a level with the part to be protected; cut little slashes in the edges of the plaster so that each may be made to fit. This type of protection is better than the ordinary corn and bunion plasters; it does not injure the skin at the edges as many corn plasters do, because it can be made of any height and is shaped to fit smoothly. Calluses and corns should not be cut. They should be treated with corn salves and then protected. But, if they must be cut, the work should be done by a physician who will use the necessary means to prevent infection, both during the cutting and as long as the wound remains open.

CHAPTER XIII

FOOT EXERCISES

Exercises to Be Taken Sitting

Exercise I.

PURPOSE. To make the feet more flexible.

POSITION. Sitting on a low stool, with the knees crossed, the right knee on top. The right ankle is grasped by the right hand, while the left hand grasps the toes and the lower part of the right foot, the thumb pressing in on the anterior arch. Reverse the position for exercise of left foot.

EXERCISE. (a) Pull the foot straight down and stretch it, at the same time pressing in with the thumb. Flex the foot well up and stretch again. (b) With the foot flexed, supinate it with the hand. (c) Starting with the foot flexed, pull it down, in, and up, making a semicircle inward.

POSSIBLE ERRORS. In (a) and (b), pronating the foot too much in the downward pull. In (c), starting from the extended position.

HINTS TO THE INSTRUCTOR. This is a good exercise to use if there is any stiffness in the feet and ankles. The movements should be made with the hand, not with the muscles of the foot and leg; that is, it should be a purely passive movement.

Exercise II.

PURPOSE. To exercise the supinators of the feet and to increase muscle control.

POSITION. The legs stretched out forward and the ankles flexed.

EXERCISE. Stretch the feet down, in, and up, making a semicircle inward, and concentrating the movement in the ankles.

POSSIBLE ERRORS. (1) Pronating the feet. (2) Letting the movement take place in the legs.

Exercise III.

PURPOSE. To exercise the supinators of the feet and to increase muscle control.

POSITION. The legs stretched out forward and the feet flexed.

EXERCISE. Turn the feet in (supinate), with the soles together and the toes contracted.

POSSIBLE ERRORS. (1) Extending the foot. (2) Rotating the legs out.

Exercise IV.

PURPOSE. To exercise the extensors and flexors of the feet and to increase muscle control.

POSITION. The legs extended forward and the feet flexed.

EXERCISE. Extend the feet well down and push down with the toes. Flex the feet well up and push down with the heels.

POSSIBLE ERRORS. Allowing the feet to swing out into pronation in pushing down or into pronation at the last when the foot is thoroughly flexed.

HINTS TO THE INSTRUCTOR. These three exercises (II, III, and IV) should be used regularly, for they not only exercise the muscles of the feet but are of real value in training to muscle control and in increasing correct muscle sense. After the feet have been used incorrectly for a long time there is a loss of muscle control and a perverted muscle sense which makes it very difficult to move them correctly. At first the student should be required to watch her feet carefully so that the movements may be correctly done. Later she should do the exercises without watching, making the same effort for correct work. The instructor should supervise the work and instantly check the student if the position of the feet becomes incorrect.

Exercise V.

PURPOSE. To exercise the muscles of the toes and of the anterior part of the foot.

POSITION. Same as in Exercise IV.

EXERCISE. (a) Keep the feet flexed and flex and relax the toes. (b) Extend the feet and flex and relax the toes.

Exercise VI.

PURPOSE. To teach the muscle control necessary to rotate the knees outward.

POSITION. Sitting, with the legs extended out forward.

EXERCISE. (a) Rotate the thighs out, then relax; at the same time notice the muscles used. (b) Holding the feet close together and keeping them still, so

that the rotation will take place in the thighs alone, contract in the muscles that are used in the outward rotation (*a*).

HINTS TO THE INSTRUCTOR. In (*b*) if the student is unable to hold her feet still, place her feet upon your thigh and hold them for her. In order to concentrate upon the muscles used in (*a*), let the student place her hands upon her thighs and feel the muscles as they contract. After she can voluntarily contract her muscles while in a sitting position, let her stand and make the same effort in the standing position. Repeat this until she can readily control the outward rotators of her thighs. Encourage her to practice this outward rotation of the thighs whenever possible during the day.

Exercise VII.

PURPOSE. To strengthen the muscles of the toes and anterior part of the foot and to train the feet to correct position.

POSITION. Sitting, with the feet parallel.

EXERCISE. Stretch the right leg forward, place the foot flat upon the floor, and contract the toes as if picking up a small object. Return the foot to the first position. Do the same exercise with the left foot and continue alternating.

POSSIBLE ERRORS. (1) Failing to start with the feet parallel. (2) Failing to place the heel upon the ground before contracting the toes. (3) Failing to bring the feet back into correct position.

HINTS TO THE INSTRUCTOR. This exercise can also be done in the standing position. Some object, such

as a small marble or rubber eraser, may be used and the exercise taken with bare feet. The student should be required to bring her feet back without watching, so that she may learn to place her feet correctly without having to look at them.

Exercises to Be Taken Standing

Exercise VIII.

PURPOSE. To teach the student the correct posture



(1)

(2)

NOTE, (1) POSITION OF KNEES AND FEET BEFORE TAKING CORRECTIVE EXERCISES AND, (2) IMPROVED POSITION AFTER TAKING CORRECTIVE EXERCISES

of the feet and knees and encourage her to hold this position.

POSITION; EXERCISE. Stand in front of a mirror with the feet straight, the body weight thrown on the outer edge and balls of the feet, the knees slightly rotated out, and the body in correct position.

HINTS TO THE INSTRUCTOR. When one is working with a case of weak feet, it is best at first to have the student exaggerate somewhat the outward roll on the edge of the feet, or the voluntary lifting up of the inside of the feet. At the same time she must be taught the correct method of standing, and the reasons for the exaggerated position should be explained to her. Frequently badly pronated feet are accompanied with inward rotation of the knees, so the knees should be



(1)

(2)

NOTE, (1) LOW ARCHES AND, (2) IMPROVED CONDITION RESULTING FROM CORRECTIVE EXERCISES

examined and if they are rotated inward the student should be taught to rotate them outward. While doing this exercise, the student should be encouraged to examine her own position and to ask questions. Better results can be reached in every case if the student understands, not only her own condition, but exactly what she is working for, and why.

Exercise IX.

PURPOSE. To give general exercise to the feet, particularly the flexors and extensors.

POSITION. Standing, with the heels out, the toes pointing in.

EXERCISE. Rise to tiptoes, then on the heels with toes lifted, rocking forward and backward.

Exercise X.

PURPOSE. To exercise the extensors and supinators of the feet.

POSITION. Same as in Exercise IX.

EXERCISE. Rise to the tiptoes, and in coming down roll on the outer edge of the feet, keeping the front part of the feet on the floor.

POSSIBLE ERROR. Failing to keep the front part of the foot on the floor when sinking to the heels.

HINTS TO THE INSTRUCTOR. This exercise is a rather difficult one to do at first. The body must be held correctly, the balance must be good, and the toes must cling to the floor as the feet are gradually brought down. It is an exercise which should be given only a few times at first as it is likely to make the muscles of the feet sore.

Exercise XI.

PURPOSE. To strengthen the supinators and extensors of the feet.

POSITION. Standing, with the feet straight.

EXERCISE. Rise to the toes and turn the heels inward while keeping the front part of the feet on the floor.

POSSIBLE ERRORS. (1) Failing to keep the front part of the feet on the floor. (2) Turning the toes out as the heels are turned in.

HINTS TO THE INSTRUCTOR. In order to get good results from this exercise, it must be done correctly. Careful instruction and oversight must be given to the student before she can execute it. The two common errors, as has been indicated, are to roll on the outer edge of the foot, bringing up the great toes from the floor, and to use the toes as a pivot as the heels are turned in. These can both be prevented by clinging to the floor with the toes, thus throwing the work upon the correct muscles.

Exercise XII.

PURPOSE. To exercise the muscles of the toes and the anterior part of the foot.

POSITION. Standing on a book, board, or stool, with the toes extended over the edge.

EXERCISE. Contract the toes over the edge of the book, board, or stool.

Exercise XIII.

PURPOSE. To exercise the flexors and extensors of the foot and to rest the muscles after other foot work.

POSITION. Standing, with the feet straight.

EXERCISE. (a) Stretch the left foot forward with the toe pointing and touch the floor. Return to position, without putting the weight on the foot. (b) Stretch the foot out at the side and touch the floor with the toe. Return to first position, without putting the weight on the foot. (c) Stretch the foot

backward and touch the floor with the toe. Return to the first position and rest the weight upon the foot.

Repeat, alternating the feet.

POSSIBLE ERRORS. (1) Failing to extend the leg and foot well. (2) Resting the weight upon the foot when it is brought back to the side in (*a*) and (*b*). (3) Failing to keep the balance and correct posture.

Exercise XIV.

PURPOSE. To stretch the muscles of the feet and legs, particularly the muscles in the back of the legs.

POSITION. Standing, with the hands on the hips, the feet straight.

EXERCISE. Bend the knees as far as possible, keeping the heels down.

POSSIBLE ERRORS. (1) Failing to keep the heels on the floor. (2) Turning the toes out. (3) Not keeping the body in correct posture.

Exercise XV.

PURPOSE. To exercise the supinators of the feet.

POSITION. Standing, with the feet parallel.

EXERCISE. Roll on the outside of the feet, curling the toes down and in.

POSSIBLE ERRORS. (1) Failing to keep the toes down. (2) Using the muscles of the thigh.

Exercise XVI.

PURPOSE. To exercise the supinators of the feet.

EXERCISE. Rise to heels and, holding the toes curled downward, swing them well in and then down on the floor. The weight of the body should be thrown on the outer edges of the feet.

HINTS TO THE INSTRUCTOR. While doing this exercise, the student must not be allowed to get her body into an incorrect posture. In order to keep her balance she may bend her trunk somewhat forward but she must keep her head and chest up. With an exercise of this type it is sometimes well to allow the student at first to steady herself by holding to a table or stall bar until she can do the exercise and keep her balance and posture without that support.

Exercise XVII.

PURPOSE. To exercise the outward rotators of the knees and to bring up the inner side of the feet.

EXERCISE. Standing, with the feet straight, rotate the knees outward.

POSSIBLE ERRORS. (1) Stiffening the knees backward. (2) Bending the knees. (3) Letting the feet come up from the floor. (4) Using the muscles of the feet instead of those of the thigh.

HINTS TO THE INSTRUCTOR. This exercise is a rather difficult one for many persons. Nearly always when the first effort to stand erect is made the knees are forced too far back. Sometimes it is done with the belief that this is the correct thing to do, sometimes merely because of the unnatural effort that is being exerted. But it is possible by practice to learn to stand and to hold the knees rotated outward while they are in a position between extension and slight flexion; that is, in an "easy" position. As this exercise is being taken, it is well to draw the attention of the student to its effect upon her feet. If it is not possible at first to do the exercise in the standing position,



DRAW THE STUDENT'S ATTENTION TO THE EFFECT OF THE EXERCISE UPON HER FEET
(Exercise XVII, Chapter XIII.)

it can be done seated. This will help to give the student the correct muscle control, but of course the exercise does not have the same effect upon the feet as when the weight is on them.

Exercise XVIII.

Stand with the feet straight, bend the knees, separate them well out, then come back to position, keeping the feet well on the floor.

Exercise XIX.

Stand with the heels out, toes in. Bend the knees, separate them well out, then come up to position, keeping the toes on the floor.

Exercise XX.

EXERCISE. Stand with the hands on the hips. Fall out forward on the right foot, right toes slightly turned in, those of the left foot straight. Bend the forward knee well down, stretching the muscles in the rear leg as much as possible. Repeat, with left foot forward.

POSSIBLE ERRORS. (1) Failing to keep the heel of the rear foot straight. (2) Allowing the heels to rise as the knees are bent further down. (3) Failing to keep the body in a good position.

Exercise XXI.

EXERCISE. Stand facing the wall or stall bars. Keeping the feet straight and heels down, lean forward and rest the hands on the wall.

HINTS TO THE INSTRUCTOR. This exercise is the more strenuous the further the student stands from

the wall. As in the other exercises of this type, the inclination is to ease up on the muscles by allowing the heels to come up from the floor.

Exercises to Be Taken Walking

PURPOSE OF THE EXERCISES. These exercises are very much like those given above, and their purpose can be readily understood by referring to *Standing Exercises*. The same foot exercises can be taken in a sitting, standing, or walking position to give variety and to add to the difficulty of doing and to the amount of work required of the muscles in the different positions.

Exercise XXII.

Walk a line toward the mirror, on tiptoes, with the toes in, the heels out.

Exercise XXIII.

Walk a line toward the mirror, on the outside edges of the feet, with the toes curled down and in, bringing the heel of the forward foot close in so that it touches the toes of the rear foot.

Exercise XXIV.

Raise the heels and walk on the toes. Raise the toes and walk on the heels.

Exercise XXV. Turkey Walk.

See Chapter VIII, Exercise IV.

Exercise XXVI. Walking Exercise.

See Chapter VIII, Exercise X.

CHAPTER XIV

VISCEROPTOSIS AND CONSTIPATION

Visceroptosis. One postural condition which can be greatly relieved by corrective exercises is that of abdominal, or visceral, ptosis. In this condition the abdominal organs are sagged out of place into positions which frequently interfere with their functions. The results are likely to be indigestion, constipation, pain from pressure upon nerves, strain upon muscles and ligaments, excessive and unnatural fatigue, and, with women, painful menstruation.

A diagnosis of this condition can often be made by means of an examination of the general posture and the shape of the abdomen; but such a diagnosis should be, if possible, verified by an X-ray examination of the abdominal content.

In the normal, erect body, the organs are held in place by means of support given them as a result of the formation and position of adjacent bones and muscles. The walls of the abdominal cavity, for example, are formed by the spinal column, the upper part of the pelvic bones, the diaphragm, and the abdominal muscles; and when the body is erect, the bones and muscles form ridges or shelves upon which the abdominal organs rest, held there securely

by ligaments, fat, and the pressure of the abdominal muscles. In a faulty posture these supporting shelves are out of position and the abdominal muscles are relaxed, so that the abdominal organs, lacking support, sag down from their positions. The organs in the pelvis lie below a ridge formed by the lumbar vertebræ, the pelvic bones, and the abdominal muscles. When the abdominal organs are held firmly in place, the pelvic organs are protected against pressure from above; but when the abdominal organs sag down, they frequently press upon the pelvic organs and the big blood vessels which nourish them. This pressure may cause the pelvic organs also to sag out of place, just as it may interfere with the blood supply which is needed to keep them in a healthy normal condition.

The correction of visceroptosis. To correct such a condition, it is necessary, among other things, to restore the body to its correct position, so that the organs may resume their places. If the condition of visceroptosis has reached a serious stage, the treatment should be given under the supervision of a physician; for it is frequently necessary to begin this treatment with rest, a fattening diet, and exercises taken in bed. When, in the opinion of the physician, the patient is ready for work in the gymnasium, the corrective work should consist of posture exercises, knee and chest exercises, and exercises performed while lying prone. No jumping or hanging should be given, nor should such exercises be used as Exercise XII in this chapter. In that and similar exercises, the pressure of the ribs and the position of the body tend to force the organs downward, whereas all effort

should at this time be directed to bringing them up into place.

If good is to result from these exercises, they must be done daily, and this fact should be impressed upon the student by the instructor. Especially is it important that those positions which permit the organs to fall back into place should each day be held for an appreciable length of time. Upon waking, and again at night before retiring, the student should give some time to this sort of exercise; and when sleeping, she should, if possible, lie on her face, with a pillow under the middle of her body. Stress should also be constantly laid on the importance of the exercises for posture, since the body must be held erect in order that the organs may be held in place.

Treatment of constipation. The treatment of constipation should not consist of exercises alone, but should include instruction as to the causes of constipation and in regard to such simple means of overcoming the condition as proper diet, the drinking of much water, and regularity in habits. At the very start, the evil effects of cathartics should be impressed upon the student, and she should be made to realize the seriousness of chronic constipation, as well as the results which follow from it.

Those of us who work with students in corrective gymnastics are at first surprised and shocked at the number who suffer from constipation, the variety and strength of medicines which they take, and the general lack of knowledge which they have on subjects of personal hygiene. An instructor in corrective gymnastics has a wonderful opportunity to give instructions on

these subjects. The work with the students enables her to learn much about them and their habits; and if she has gained their confidence, they will not only listen to her advice, but will usually carry it out. An instructor should, therefore, inform herself as to the correct means of preventing or curing such conditions as constipation, and she should always be ready to listen to and advise the students. Giving medicines is not a part of an instructor's work; if a student really needs medicine, she should be sent to a physician. But cases of constipation, painful menstruation, sleeplessness, and other conditions are frequently caused by irregular habits, improper food, or lack of exercise, and an instructor may be able to assist a student in overcoming these conditions without medicine.

Exercises for Visceroptosis and Constipation

(To Be Taken While Lying on the Back)

PURPOSE OF THE EXERCISES. To strengthen the abdominal muscles and help to push the organs into place.

Exercise I.

POSITION. Lying on the back, with the arms at the sides.

EXERCISE. Raise the right leg with the knee bent; clasp the knee with the hands and press the thigh against the abdomen. Extend the leg and lower to place. Repeat with the left leg and then with both together.

Exercise II.

POSITION. Lying on the back, with the hands under the head.

EXERCISE. Reach down hard with the right leg, raise the left leg with the knee bent and press the thigh against the abdomen. Repeat, alternating.

POSSIBLE ERRORS. (1) Increasing the lumbar curve as the legs are lowered. (2) Letting the trunk be lifted by the movement of the legs. (3) Failing to keep the legs in the desired position.

Exercise III.

POSITION. Lying on the back, with the extended legs up against a wall.

EXERCISE. Flex the right knee and bring the thigh down against the abdomen, keeping the other leg



FLEX THE RIGHT KNEE AND BRING THE THIGH
DOWN

(Exercise III, Chapter XIV.)

extended. Bring the left leg down with the knee bent, as the right leg is again extended against the wall. Continue alternating, extending one leg as the other bends.

Exercise IV.

PURPOSE. To place the body in a position that will draw up the abdominal organs and remove their pressure against the pelvic organs.

EXERCISE. Lie on the back with a pillow or pad under the body just below the shoulder blades, the head low, the legs extended.

Exercise V.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Bring one flexed knee well up, pressing the thigh against the abdomen, and return to position. Do the same with the other leg, alternating. (b) Clasp the hands under the abdomen and bring the flexed knee well up, pressing the thigh against the clasped hands. Continue, alternating.

Exercise VI.

POSITION. "Knee Chest Position." (Exercise II, Chapter XV.)

Exercise VII.

POSITION. Prone lying off a couch or over a chair. (Exercise III, Chapter XV.)

Exercise VIII.

POSITION. Prone lying over a pillow. (Exercise I, Chapter XV.)

*Exercises for Constipation (Not to Be Used if There
Is Marked Visceroptosis)*

PURPOSE OF THE EXERCISES. To exercise the muscles of the abdomen and stimulate the muscles of the intestines.

Exercise IX.

POSITION. Sitting astride a stool, with the arms behind the back, the hands clasped.

EXERCISE. Bend forward and twist first to the right, then to the left, and continue alternating.

Exercise X.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Twist the body to the right, then to the left. Continue alternating. (b) Bend forward and roll the body around, first to the right then to the left, alternating.

Exercise XI.

POSITION. Standing, with the arms overhead.

EXERCISE. Bend forward, keeping the knees stiff, and touch the floor with the extended fingers.

Exercise XII.

POSITION. Standing, with the hands on the hips, the fingers well forward upon the abdomen.

EXERCISE. Keeping the knees stiff, bend forward and press in with the fingers.

CHAPTER XV

EXERCISES FOR MENSTRUAL DISORDERS

An important field for corrective work. In few fields of our work have the results of exercises been more satisfactory than in the treatment of menstrual disorders. We do not assert that this method is infallible, for there are many cases of this type into which enter such conditions as to make any class of exercises undesirable. But experience has shown that, in many cases, pain has been relieved, nervousness at the time of the monthly period done away with, and an improved general condition brought about.

Many girls who enter college with the feeling that, because of their menstrual condition, they should be excused from all gymnasium work, realize later, after taking special exercises, that they have been greatly benefited. And many times when, after such treatment, it has been suggested to a girl that she transfer to a regular gymnasium class, she has begged to be allowed to continue with the special exercises because so great was her former pain that she is anxious to prevent its recurrence.

Thus it happens that, besides the girls who come to the corrective gymnasium because the work is obligatory, many other girls, juniors and seniors, of whom no gymnasium work is required, come for exercises,

merely because they have heard of the relief given to others through these same exercises.

Growing belief in this work among physicians. The giving of exercises to relieve menstrual disorders is not new; for several years it has been practiced in corrective gymnasiums with good results. Up to a very recent date, this practice has not, it is true, been generally upheld by physicians. They have seemed to feel that too much was claimed for it. Lately, however, several articles have been published in medical magazines recommending this type of work, not only for disordered menstrual conditions, but as a means of preparing women for operations upon the uterus or of hastening their recovery after such operations.

Dysmenorrhea frequently accompanied by poor posture. The majority of girls, who enter corrective classes, suffering with painful menstruation, are girls with poor posture, weak abdominal muscles, and a generally poor muscular condition. With these cases, the pain and irregularity are, as a rule, caused by sagging or misplaced organs which, pressing upon each other, interfere with the circulation and cause an increased congestion at the time of the period. The most usual type of misplacement is retroversion, or a falling backward of the uterus; and for this condition special exercises are given. Anteversion is less common, but exercises for this condition are also provided.

Treatment should include instruction. The treatment for these cases is very simple. First, the posture must be corrected; then the organs must be made to return to place and the abdominal muscles must be

strengthened to aid in holding them. In order to relieve congestion, suitable breathing exercises must be given, and the student must be advised as to the amount of exercise and rest that she should take at the time of her menstrual period. Not the least important part of this corrective work is the instruction that should be given to the girl as to her care of herself. Girls appear to know very little about themselves; hence many apparently careless things which they do can be attributed to ignorance or to a lack of appreciation of the importance of what they have been told to do or not to do at the time of the menstrual period. But, with a clear understanding of the reasons for taking care of themselves, they, as a rule, are willing and glad to pay attention to the things they have been taught. And since many of the nervous conditions from which women suffer are caused by lack of knowledge, those of us who work with girls should be ready to meet with sympathy and understanding the questions they put to us.

Exercises for Correcting Retroversion of the Uterus

PURPOSE OF THE EXERCISES. To cause the abdominal organs to fall back into place, at least temporarily, thus relieving the pressure of other organs upon the uterus and also increasing the return flow in the vena cava.

Exercise I.

POSITION. Lie on the face, with a pillow under the pelvis so as to raise it above the level of the head and shoulders.



FOR CORRECTING RETROVERSION
(Exercises II and III, Chapter XV.)

HINT TO THE INSTRUCTOR. This position should be taken in bed and as far as possible held throughout the night.

Exercise II. Knee Chest Position.

POSITION. Kneel upon a plinth or a bed, with the knees slightly separated; bend forward and rest the chest upon a pillow; then turn the head to one side and rest it and the arms upon the plinth or bed.

EXERCISE. Hold the position and at intervals take deep breaths.

Exercise III. Prone Lying off a Couch or Chair.

POSITION. In this exercise the body hangs down over the edge of the bed or couch, the head, chest, and arms resting upon a pillow on the floor. The legs are so placed on the couch that the edge of the couch comes just at the bend of the legs; that is, at the groin. If the couch is too high, the pillow should be on a stool of such height as to let the trunk incline down from the bed.

HINTS TO THE INSTRUCTOR. As this position and that in Exercise II are to be held for some time, sufficient support must be given by the pillows to prevent discomfort. Care must be taken not to increase the lumbar curve, as that would result in a position not only incorrect, but tiresome and likely to cause pain in the back. The upside-down position seems an uncomfortable one, but if it is held at first for only a few minutes and the time gradually increased, the student becomes accustomed to it and can hold it for some time without discomfort.

The exercise may also be taken in the following way: Turn a chair upside down and place one pillow so that it lies partly between the rear legs of the chair and partly over the back; then place a second pillow partly on the back and partly on the floor. Lie down on the chair over the pillows so that the body rests upon the reversed back of the chair and the legs come between the rear legs of the chair. In this position, the feet should be supported by a stool or second chair. This position can become quite comfortable and can be held for a long time, after the student has accustomed herself to its upside-downness. Deep breathing should be taken at intervals with both the foregoing exercises. This exercise and the knee chest position should be taken night and morning and, if used at the time of menstruation, will frequently relieve pain.

Exercise IV.

POSITION. Lying face down.

EXERCISE. Raise the body on the elbows and toes; then return to face-down position. Repeat.

Exercise V.

POSITION. Rest both hands and feet on the floor, with the legs as straight as possible so that the trunk will incline downward toward the head.

EXERCISE. Walk on the feet and hands.

Exercise VI. Deep Creeping.

POSITION. Kneel, with the right knee in front, the left knee slightly back, the right hand on the floor on the outer side of the right knee, and the left arm stretched out with the hand on the floor in front of the

right knee. Twist the head with the face to the right, and rotate the trunk with the left shoulder up.

EXERCISE. (a) Draw the left knee forward to the inner side of the left hand. Extend the right arm first above the head and then as far in front of the left knee as possible. Twist the face to the left. (b) Proceed by bringing forward the right knee, extending the left arm in front of the right knee, etc.

Exercise VII. Abdominal Breathing.

See Chapter XVI, Exercise VII (c).

Additional Exercises. To Exercises I-VII add posture exercises (Chapter VII) and abdominal exercises (Chapter VIII). Do not give hanging exercises.

If the menstrual flow is quite profuse, the pain intense, or the girl in a run-down condition, it is well not to allow her to take part in any sport, but to require, in its place, some hours of rest each day.

Exercises for Correcting Anteversion of the Uterus

Exercise VIII.

Lying on the back, raise both legs overhead.

Exercise IX.

Lying on the back, raise the body up at the hips, letting the weight rest upon the feet and shoulders.

Exercise X.

Sit on a stool, with the feet caught under the stall bars. Bend forward as far as possible, then backward.

Exercise XI. Bicycle Exercise.

See Chapter XIV, Exercise III.

CHAPTER XVI

BREATHING EXERCISES

Why breathing exercises are needed. The majority of people, whether because of incorrect posture, faulty clothing, or poor general habits, do not use their lungs correctly; therefore breathing exercises should be considered an important part of corrective work. However, it should be borne in mind that breathing is a natural process and will be properly done if the posture is correct and the body unimpeded.

Various types of breathing exercises. There is much discussion as to the correct method of giving breathing exercises. One authority insists that to fill the lungs as they should be filled one must imagine that he is smelling a flower or some kind of perfume. Another points out in this connection, that, in the act of smelling forcibly, the nostrils are partly closed, a condition which necessarily interferes with the free entrance of air. Again it is stated that, in all breathing exercises, inhalation should be through the nose, exhalation through the mouth. The reasons for this belief are so far from convincing, it would seem that the authorities opposed to it must be correct when they teach that both inhalation and exhalation should be through the nose. Finally, opposed to the idea that "deep breathing" should be given with all

exercises, is the theory that one should breathe as nature requires while doing most exercises, and use specific deep breathing exercises only in the intervals between other exercises and at the end of the period, as a means of quieting and resting the whole body. To the author, this last-mentioned view seems reasonable.

Breathing exercises of benefit. No matter how authorities may differ as to the time and methods for giving breathing exercises, there can be no doubt as to the benefit which can often be derived from them. It must be remembered, however, that breathing exercises can be used to excess, just as they can be incorrectly given.

The "Yogi" method. A method that has found many advocates is the "Yogi." In this method the breath must first be drawn to the lower part of the lungs, swelling out the abdomen; then the breath must fill the middle part of the lungs, pressing out the lower ribs; and lastly the chest must be filled and swelled out. After the lungs are filled they must be emptied in the same way, first: the lower part; second, the middle part; third and last, the upper part of the lungs. One is assured that, if this method is well practiced, it will grow to be quite easy, finally becoming established as the natural way of breathing. This exercise is generally taken first in a reclining position, and the breath is so controlled that the periods of inspiration and exhalation are of equal length.

Breathing with the body relaxed. In the corrective gymnasium, the student should be taught to fill her lungs well with each breath, controlling the speed of

inhalation and exhalation, but not attempting to place the breath in the lungs as in the Yogi or in any other formal breathing exercise — just letting it go wherever it naturally flows as the lungs become filled. This exercise is given while the student is lying on her back; and before beginning the breathing exercise, she should be taught to relax absolutely.

Difficulty in relaxing. A great many students do not know how to relax during a breathing exercise, and are constantly using their muscles to place the breath in some one part of their lungs, or, as one student put it, "in some part of the body, such as the chest or the abdomen." Students, who have been taught some special method of breathing, have often become so accustomed to breathing by that method that it is almost impossible for them to take a full natural breath. These methods have been used for some good reason no doubt, such as, for example, to fill the lungs rapidly and empty them slowly as one must in singing. But should not these young people also have been given breathing exercises for the whole lung to enable them to use their lungs correctly when they were not singing? Is such a practice not equivalent to developing the muscles in one arm because we need that arm for special work, while we let the other arm get weaker and weaker?

Even in general gymnasium work there is room for improvement; for the breathing exercises most used are those in which the head and arms are thrown backward and the chest up. One reason for the popularity of these exercises is, that while the students are standing these are the easiest to give, and their

performance takes so short a time that they can be given two or three times at the last minute just before the class is dismissed. It is true that such breathing exercises have a value, particularly after violent or rapid exercise. The movements of the arms, accompanied by rhythmical controlled breathing, help to regulate the venous and lymphatic flow and steady the heart action. During the few minutes given to these exercises the circulation and respiration return to normal, and the student is in much better condition to react from the shower which follows her work. But their value, particularly when given in the usual hurried, superficial way, should not be so overestimated as to permit them completely to take the place of more thorough breathing exercises. .

Use of breathing exercises to improve the chest. Accompanying other conditions caused by poor posture are flat chest and narrow costal angle. To correct these it is necessary to have exercises to stretch the contracted muscles of the chest and widen the costal angle. The various breathing exercises given with arm lifting are unusually good for these purposes, so that they should be part of the list of breathing exercises used in the corrective department. At the same time the instructor should recognize the fact that these do not increase the capacity of the whole lung and should not be used to the exclusion of other breathing exercises. In the list given below we have included breathing exercises of sufficient number and variety not only to provide the exercises needed to correct narrow chests and faulty use of the lungs, but also to keep the work from becoming monotonous.

Deep breathing for tuberculosis. In the incipient stages of tuberculosis, breathing exercises are of great benefit; and if the physician who has diagnosed and is treating the case approves, there is no reason why this treatment should not be given in the gymnasium.

The treatment should begin with slow deep breathing. The patient should not be allowed to put forth too much effort, or to overexpand the lungs. On the contrary, she should be guarded carefully against fatigue, time for rest being given between all exercises. Gradually the length of time for the exercise and the effort on the part of the patient may both be increased, but throughout the treatment overfatigue must be avoided.

With a well developed case or a case which is known to be active, breathing exercises should not be given. In these conditions the lungs need quiet and easy breathing, as forced breathing might cause a hemorrhage.

Deep breathing for asthma. Breathing exercises can often be used to relieve the spasmodic coughing spells of asthma. These coughing spells frequently occur when the patient first lies down or when the air in a room becomes close; or they are brought on during sleep by a filling up of the throat with mucus. They are also caused by nervousness, or by overexertion. The attack of coughing is accompanied by a spasm of the circular muscle fibres of the bronchial walls and a spasmodic movement of the diaphragm. By deep, rhythmical, controlled breathing the throat and bronchial tubes can be cleared and this spasm of the muscles controlled. The breathing should be begun

as soon as the oppression and desire to cough is felt, and it should be continued at intervals until the condition is relieved. Many cases of asthma can be materially helped by controlled breathing, regularly practiced.

Deep breathing for abnormal heart conditions and menstrual disorders. Deep breathing is used with benefit for abnormal cardiac and menstrual conditions, as is more fully explained in the chapters treating of these subjects.

Aims of deep breathing. The aims in giving deep-breathing exercises are as follows:

1. To strengthen the muscles of respiration, particularly the diaphragm.
2. To increase the mobility of the lungs and chest.
3. To secure equal development of all parts of the lungs.
4. To enlarge the chest capacity and breathing capacity of the lungs.
5. To deepen habitual breathing.
6. To improve the circulation.
7. To help increase the flow of blood through the inferior vena cava.
8. To lower the blood pressure and to quiet the heart after violent exercise.
9. To cause a freer flow of blood and lymph to those distant parts of the lungs not habitually used.
10. To relieve congestion in the organs in the pelvic region.
11. To quiet the nerves and to relieve insomnia.

Exercise I.

POSITION. Lying on the back, with the arms down at the sides and all the muscles of the body relaxed.

EXERCISE. Draw the breath in slowly through the nose; hold for an instant, then slowly breathe out through the nose. The inhalations and exhalations should be of equal length.

POSSIBLE ERRORS. (1) Trying to control the breath in order to force it into some specific region of the body. (2) Breathing through the mouth. (3) Failing to make the exhalation and inhalation of equal length.

HINTS TO THE INSTRUCTOR. See that each student is thoroughly relaxed before she begins the exercise. If a student should find it difficult at first to relax when stretched out flat, let her flex her knees, put one arm under her head, or make any slight change in position which will help her to complete relaxation. To keep the breathing rhythmical, count aloud the same number for inhalation as for exhalation. Begin with a small number, such as six or eight, and increase when that breathing period becomes easy. A count of thirty for inhalation and thirty for exhalation will give expansion great enough for class work, although individuals can often continue much longer than this. To keep the rhythm for individual work, students may count mentally.

Exercise II.

POSITION. Same as in Exercise I.

EXERCISE. (a) Inhale as in Exercise I. (b) Hold the breath and contract the abdominal muscles; then exhale as in Exercise I.

Exercise III.

POSITION. Standing, with the arms down at the sides.

EXERCISE. (1) Bring the arms up and out at the sides to shoulder height, turn the palms up, take the arms back as far as possible without losing correct posture. (2) Bring the arms back to the shoulder position, turn the palms down, and let the arms sink slowly to the first position. Inhale, as the arms go up and out; exhale, as they come back and down.

Exercise IV.

POSITION. Standing, with the arms down at the sides.

EXERCISE. (a) Bring the arms out and up to shoulder height, with inhalation. (b) Keep the palms down, circle with the arms back and down to first position, with exhalation.

POSSIBLE ERRORS. (1) Dropping the head and chest forward as the arms go back. (2) Increasing the lumbar curve. (3) Letting the weight go back on the heels.

HINTS TO THE INSTRUCTOR. In an exercise of this type care must be taken to see that the arms are not pushed back farther than the student can stretch without losing correct posture. The object of the exercise is to stretch the muscles of the chest and to increase the mobility of the upper thorax; but no stretching or effort should be pushed to the point where posture must be sacrificed. The whole object of the exercise is lost if the chest and head are dropped forward; for, in that position, the pull upon the chest

muscles is less than when the chest is held well up and the arms stretched back against that resistance.

Exercise V.

POSITION. Standing, with the arms down at the sides.

EXERCISE. Rotate the arms outward, inhaling as they go back, exhaling as they return to place.

Exercise VI.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Drop the chin forward on the chest, keeping the body in good position. Push the head and neck back, keeping the chin low and breathing in. (b) Bring the head forward again, breathing out.

Exercise VII.

PURPOSE. To expand the lungs in the upper part, or chest region; in the middle part, or region of the lower ribs; in the lower part, or region of the diaphragm.

POSITION. Lying on the back.

EXERCISE. (a) With the hands resting on the chest, inhale and exhale in rhythm, forcing the chest up against the hands. (b) With the hands against the floating ribs, inhale and exhale in rhythm, trying to force the ribs out against the hands. (c) Lay the hands across the abdomen, and begin abdominal breathing. Inhaling, push the hands up with the abdominal muscles; exhaling, pull the abdomen away from the hands.

In other exercises. Deep breathing is of advantage in any exercises in which the chest muscles are stretched by the raising of the arms. Several of these may be found in Chapter VIII.

CHAPTER XVII

EXERCISES TO IMPROVE COÖRDINATION AND BALANCE

Poor muscular coördination in children. Marked cases of poor muscular coördination are not very frequently found among university students; they are much more common in the elementary schools. These cases are distressing to teachers as well as child, for pupils of this type are likely to be nervous and irritable and rather hard to control. The very effort that they must make to be and do as other children causes them to be nervous. Then, too, they are often misunderstood, found fault with, even scolded, for actions for which they should not be held responsible. Many people seem to think that children can be scolded into doing the correct thing; they fail to realize that the root of the difficulty often lies in a condition of the nervous system which can only be corrected by patient training and care. Nor should the word "care" be construed to mean "constant watchfulness" by elders. Unless the child is, at times, left alone, so that he can be natural, even awkward when he wishes to be, he feels an additional constraint and nervousness which is due to excessive supervision on the part of his elders.

Sympathetic treatment necessary. To be successful with cases of this type, an instructor must, in the

first place, be fond of children. In the treatment of such cases, an unending amount of patience is needed. The instructor must remember that lack of coördination is due to weakness and that a child suffering with it is quickly fatigued. Hence the instructor in corrective gymnastics must be willing to do a moderate amount and then stop.

Lack of muscular coördination in college students. Lack of coördination and balance is also found among college students, but, as has been said, to a much less marked degree than among children. With a student sufficiently mature, the treatment should begin with lessons in definite voluntary muscle control. There should be such exercises as Exercise II in Chapter VIII, or Exercise XIX in Chapter IX; and there should be general good posture exercises.

Combination of exercises and play for children. In the treatment of a child, some well-chosen exercises should be given, but much can be done by directing the play to those games which require quiet, definite, well-controlled movements.

Marked cases should be treated under a physician's direction. Treatment of a child who is suffering to a marked degree from this condition, should, of course, be given under the supervision of a physician, so that the general health will be looked after.

For this extreme condition, as well as for other less serious cases, the treatment should begin with exercises for correct posture. The following exercises, to be found in Chapters VIII and IX, are suggested: Chapter VIII, Exercises I, II, III, IV, V, IX, and X; Chapter IX, Exercises X, XIII, XIV, and XVIII.

Exercise I.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Select an object across the room and walk directly up to it. (b) Select a point upon the wall or an object on a table across the room and, holding the arms outstretched, walk over and touch the object.

Exercise II.

POSITION. Standing, with the hands on the hips, at one end of a line of blocks or cards placed at regular intervals on the floor.

EXERCISE. (a) Step in between the blocks, taking care not to put the foot upon them. (b) Step on the blocks.

Exercise III.

POSITION. Standing, with a wand held horizontally in front.

EXERCISE. (a) Bring the wand overhead. (b) Bring the wand down on the right, keeping the arms extended. (c) Bring the wand overhead. (d) Bring the wand down on the left. (e) Bring the wand overhead. (f) Bring the wand down in front.

Exercise IV.

POSITION. Standing by a stool or chair.

EXERCISE. (a) Raise one foot and place it on a chair; then return it to the floor. Repeat with the other foot. (b) Repeat the exercise with the eyes closed.

Exercise V.

POSITION. Standing, with the back toward a stool or chair.

EXERCISE. (a) Sit down on the stool and get up again. (b) Repeat with the eyes closed.

Exercise VI.

POSITION. Standing at the foot of a flight of steps or in front of stall bars.

EXERCISE. (a) Climb, putting the feet on each step. (b) Repeat, with the eyes closed.

Exercise VII.

POSITION. Same as above.

EXERCISE. (a) Climb, putting the feet on every alternate step. (b) Repeat, with the eyes closed.

Exercise VIII.

POSITION. Standing three or four feet from a row of Indian clubs.

EXERCISE. (a) Walk forward and pick up a pin designated by the instructor. (b) Walk forward and touch the indicated pin with the left foot. Then alternate.

Exercise IX.

Building with blocks, cards, or matches.

Exercise X.

Playing "Pease Porridge Hot" or any similar game.

Exercise XI.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Place the foot forward a measured

distance. Alternate. (b) Place the foot sideways a measured distance. Alternate.

Exercise XII.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Charge forward, keeping the rear foot straight. (b) Lift the rear foot from the floor, bend the supporting knee, then straighten the supporting knee. (c) Replace the rear foot and return to standing position.

Exercise XIII.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Stretch the left foot forward. (b) Bring it back without touching the floor. (c) Stretch the foot backward. (d) To place without touching. (e) To the side and back to place with the weight on both feet. Alternate with the right foot.

Exercise XIV.

Walk the balance beam with (a) the arms outstretched as a balance, (b) the hands on the hips, (c) the hands back of the neck, or (d) the arms stretched overhead holding a wand.

Exercise XV.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Bring the finger-tips to the sides of the shoulder. Keep the elbows at the waist. (b) Stretch the arms sideways and extend the right leg out to the side, touching the toe to the floor. (c) Twist the trunk toward the extended leg, keeping the head well up, the chest expanded, and the arms

well back. (d) Return the trunk to position. (e) Return the arms and leg to position. (f) Bring arms to the side.

Repeat, using left leg.

POSSIBLE ERRORS. (1) Bringing the finger-tips too far forward. (2) Stretching the arms out unevenly. (3) Dropping the head forward, in any part of the exercise. (4) Letting the arms swing forward as the trunk is twisted. (5) Letting the twisting movement extend into the pelvis. (6) Letting the body sag down in any part of the exercise.

HINTS TO THE INSTRUCTOR. The chief value for coördination in this exercise and in the following one is the training in bringing both arms and legs into definite positions upon order, and by gradually increasing the speed in which the exercise is executed, teaching control of the arms and legs during rapid movement. When giving an exercise to a student who has poor coördination, give the orders slowly at first, until she understands and can follow them. Then gradually give the orders more rapidly; but be careful not to be too quick or too impatient, for anybody suffering from a marked degree of lack of coördination is easily confused and discouraged.

Exercise XVI.

POSITION. Standing, with the arms at the sides.

EXERCISE. I. (a) Bring the finger-tips to the sides of the shoulders, keeping the elbows at the waist and raising the bent knee. (b) Stretch the arms forward, extend the leg that was raised, and touch the toes to the floor in front. (c) Return to (a), then stretch the

arms sideways, extend the leg sideways, and touch the toes to the floor. (d) Bring both arms and leg back to position. 2. (a) Same as in 1, (a). (b) Stretch the arms upward, extend the leg, and touch the toes to the floor in front. (c) Return to (a), then stretch the arms sideways, extend the leg sideways, and touch the toes to the floor. (d) Back to position.

Repeat, using the other leg.

CHAPTER XVIII

EXERCISES FOR CERTAIN WEAK OR STIFF JOINTS

Weak or stiff joints. That field of therapeutic gymnastics which includes serious joint conditions caused by infantile paralysis or other diseases or injuries, does not belong to the college gymnasium. Such treatments should be given only by those who are thoroughly trained in that type of work and should be under the supervision of a surgeon. But there are found, in most large schools, cases of weak or stiff joints which can be greatly helped by well directed work in the gymnasium. To meet this necessity we include in this chapter a limited number of exercises for helping various joints that may have become weak or stiff from minor causes. Such exercises should not, however, be given unless approved by the examining physician.

Such conditions as chronic subluxation of the knee or shoulder which has been caused by too long continued bandaging and rest after an injury, stiff joints which have followed breaks, and chronic muscle weakness caused by infantile or obstetrical paralysis are frequently found when examining large groups and can often be helped by such exercises as those indicated below.

*Shoulder Exercises***Exercise I.**

PURPOSE. To stretch the muscles around a stiff shoulder joint, or as a form of assistive exercise to strengthen a weak shoulder joint.

POSITION. Standing, with the arms at the sides.

EXERCISE. (a) Bring the arms up sideways to the shoulder level, palms down. (b) Bring the arms forward and up to shoulder height, palms in. (c) Bring the arms up sideways to shoulder level, palms down, and rotate them back turning the palms up. (d) Bring the arms forward and up over head. (e) Rotate the arms at different levels. (f) Circumduct the arms, forward, back, and around; backward, up, and around.

HINTS TO THE INSTRUCTOR. These exercises may be varied by combining them with arm bending exercises, or can be made more strenuous by giving resistance. This resistance may be supplied by the instructor or by the use of pulley weights, dumb-bells, or rowing machine.

Exercise II.

PURPOSE. See Exercise I.

POSITION. Standing, (a) facing the wall, (b) with the side to the wall.

EXERCISE. Place the hand on the wall and creep up with the fingers.

HINTS TO THE INSTRUCTOR. If this exercise is being used to stretch the muscles around a joint, the student should be encouraged to reach higher and higher on the

wall, and a mark should be made each day at the highest point which she is able to reach.

Exercise III.

PURPOSE. See Exercise I.

POSITION. Standing, with the hand on the side of the stiff shoulder behind the back, palm backward, grasping a wand.

EXERCISE. Grasp the other end of the wand with the other hand and pull it out sideways.

Exercise IV.

PURPOSE. See Exercise I.

POSITION. Standing or sitting.

EXERCISE. Bring the hand (*a*) back of the neck, (*b*) over the head, (*c*) forward and over the other shoulder.

Exercise V.

PURPOSE. To stretch the muscles in a stiff shoulder.

POSITION. Sitting by the side of a table or in a chair with a wide arm.

EXERCISE. Rest the elbow with the stiff shoulder on a pile of blocks or books as high as the arm can be raised. Continue piling up the books as the joint is stretched to admit them.

Exercise VI.

PURPOSE. To stretch the muscles around a shoulder joint.

EXERCISE. (*a*) Hanging on the stall bars, rings, or boom. (*b*) Travelling on a boom.

*Exercises for the Elbow***Exercise VII.**

PURPOSE. To strengthen the muscles at the elbow.

EXERCISE. Arm flexion and extension (*a*) without resistance, (*b*) with resistance from the instructor, (*c*) with pulley weights, (*d*) with dumb-bells.

Exercise VIII.

PURPOSE. Same as in Exercise VII.

EXERCISE. Arm bending (*a*) with elbows on a level with the shoulder, (*b*) elbows at the waist, (*c*) elbows back of, or in front of, the body.

HINTS TO THE INSTRUCTOR. These movements must of course be given with all due attention paid to the muscles to be developed — omitting resistance in flexion if the extensor muscles are being treated, in extension if the flexors are being treated.

Exercise IX.

PURPOSE. To stretch a stiff elbow joint.

EXERCISE. Hang on stall bars, rings, or boom.

Exercise X.

PURPOSE. Same as in Exercise IX.

POSITION. Sitting, with the elbow resting on a support, and with wrist and forearm grasped by the instructor.

EXERCISE. The instructor stretches or bends the elbow.

HINTS TO THE INSTRUCTOR. No treatment of this kind should be attempted by an instructor unless she is sure of the physician's diagnosis of the case. The

advice of a physician should be obtained before beginning the treatment.

The movement of forcible stretching should be a steady, even pull; all jerky, uneven movements should be avoided. It is sometimes possible to obtain a greater range of movement if the treatment is given in the following way: Begin with a resistive movement, and when the muscles of the arm are well relaxed change over quickly to a passive movement; that is, while the student is trying to contract the arm resistance can be given, and then while the extensor muscles are completely relaxed the movement can be changed over quickly into one of passive flexion. These changes should be made quickly but with a steady well-controlled movement.

Exercises for the Wrist

PURPOSE OF THE EXERCISES. To strengthen the wrist.

Exercise XI.

EXERCISE. Flexion and extension of the wrist
(a) without resistance, (b) with resistance.

Exercise XII.

EXERCISE. Abduction and adduction of the wrist
(a) without resistance, (b) with resistance.

HINTS TO THE INSTRUCTOR ON EXERCISES XI AND XII. Resistance can be given in these cases in several ways: (1) by the instructor; (2) by the student, using her other hand; (3) with pulley weights; (4) with dumbbells.

Exercise XIII.

EXERCISE. Circumduction of the wrist in two directions.

HINTS TO THE INSTRUCTOR. There is no true movement of circumduction in the wrist, but a somewhat circular movement can be made up of the other movements; and this exercise of rolling the hand round and round, moving it around first one way then the other, should be given so that all movements of the wrist may be brought to normal.

*Exercises for Fingers***Exercise XIV.**

(a) Flexion. Close the fingers into the palm. (b) Flex the joints separately. (c) Adduct the fingers. (d) Abduct the fingers.

*Exercises for the Thumb***Exercise XV.**

(a) Flex both joints. (b) Extend both joints. (c) Adduct the thumb. (d) Abduct the thumb. (e) Circumduct the thumb both ways.

*Exercises for the Thumb and Fingers Together***Exercise XVI.**

EXERCISE. (a) Touch the thumb to the finger tips. (b) Touch the thumb to the different joints of the fingers. (c) Bring the straight thumb and fingers close together making a hollow in the palm of the hand.

HINTS TO THE INSTRUCTOR. The exercises for both

the thumb and fingers should be given passively, actively, and with resistance. To enable the student to flex and extend the upper joints of a finger the instructor should grasp the fingers just below the joint. The student can be taught to hold or resist in her own exercises.

When exercising a stiff wrist or stiff fingers, the student should constantly compare one hand with the other to see that the movements or degree of flexion and extension are normal. She must not forget that she should be able to hold the fist closed and bend the wrist forward at the same time and that the treatments should not be discontinued until all movements are perfect.

Perhaps the best results with the fingers can be reached by the use of the hands in manual work. But one should be very sure that the movements of the hands and fingers in the work are the correct ones to develop the muscles which are weak, and that they do not overexercise those muscles already too strong. In most work the fingers are constantly flexed, and if the flexor muscles are already too strong such movements are injurious.

Exercises for the Muscles of the Hip Joint

Exercise XVII.

EXERCISE. (a) Flex the hips by raising the legs (1) while standing, (2) while lying on the back.

(b) Abduct and adduct the thighs (1) while standing, (2) while lying on the back.

(c) Circumduct the thighs (1) while standing, (2) while lying.

(d) Rotate the thighs in and out (1) while standing, (2) while lying.

(e) Knee bending while standing.

HINTS TO THE INSTRUCTOR. It is not necessary to describe these movements as they are already described in full in other chapters. Movement (a) is described in Chapter IX; movements (b), (c), and (d) in Chapter XVIII; and movement (e) in Chapter XIII.

Exercises for Weak Muscles around the Knee

Exercise XVIII.

POSITION. Sitting.

EXERCISE. Extend the knee (a) without resistance, (b) with resistance.

Exercise XIX.

POSITION. Lying on the face, with the knees bent.

EXERCISE. Bring the leg down (a) without resistance, (b) with resistance.

HINTS TO THE INSTRUCTOR ON EXERCISES XVIII AND XIX. In both of these exercises, resistance can be given by putting one ankle over the other. To supply any real benefit, the exercises must be practiced daily; and since a student, as a rule, comes to the gymnasium only once or twice a week, it is well to suggest to her ways in which she can give herself the resistance she is accustomed to receive from the instructor.

Exercise XX.

POSITION. Sitting on a flat surface, with the legs stretched out.

EXERCISE. (a) Voluntarily contract the extensor muscles of the knee, pulling up the patella. (b) Contract the inward or outward rotators of the knee, according to the need.

Exercise XXI.

POSITION. Standing.

EXERCISE. (a) Knee bending. (b) Extend the strong knee, keeping the foot off the floor, and take (a) with the weak knee.

HINTS TO THE INSTRUCTOR. The knee movements given in Exercises XX and XXI are for the extensors and rotators only. The most common condition requiring knee exercises that is found in a college gymnasium is subluxation of the knee. In this condition the weak muscles are those of extension and rotation. In these cases exercises such as have just been indicated and massage will be found helpful. To exercise the flexors the directions given in Exercises XVII and XIX should be reversed.

Exercises for the Ankles

See Chapter XIII.

Exercises for Sacroiliac Strain

See Chapter IX, Exercises III, X, and XV; and Chapter XIV, Exercises II and XI.

CHAPTER XIX

EXERCISE IN ABNORMAL THYROID AND HEART CONDITIONS

The reason for this chapter. It may appear to many that a discussion of exercises for abnormal thyroid and heart conditions would belong rather in a medical treatise than in a book written for instructors in physical education. It is quite true that the treatment of both abnormal heart and thyroid conditions belongs entirely to the physician, but cases of both these conditions, usually of mild form, are found in many gymnasiums, especially in the gymnasiums of schools where physical education is one of the requirements. It therefore seems absolutely necessary that the instructor should understand something of such cases as these, if only to know what exercises not to give.

Supervision of physician necessary. Such cases should, of course, be under the constant supervision of a physician, so that he can inform the instructor when unfavorable symptoms arise, and if necessary, advise the student to withdraw from the gymnasium.

Types of thyroid cases found in a gymnasium. In a gymnasium carefully supervised by a physician, the advanced cases of thyroidism will not be found. The type of case assigned to the gymnasium will be of that

milder form for which some sort of exercise is necessary to keep the student in as good condition as possible. Supervised work in the gymnasium is probably the best form of exercise which the student can take especially during the winter months.

These cases may be either hyperthyroid conditions or hypothyroid conditions. As far as the work of the gymnasium instructor is concerned, the treatment of the two types is practically the same. Overwork must be guarded against in both cases, and the probability of a weakened heart should always be one of the factors to be considered in making up a schedule of exercises. There are certain exercises which should be omitted altogether. Exercises affecting the muscles of the front of the neck, hanging exercises, rapid marching, running, and any rapid, strenuous exercises are not advisable for either type of case.

Sympathetic treatment necessary. To be of benefit to the student, work must be made as interesting as possible; there must, therefore, be some definite object for which to work. In order to make her feel that there is such a definite goal to be worked toward, the schedule of exercises should be as carefully planned as those of the other students. To begin with, many students who have thyroid trouble have poor posture or weak feet, conditions which can be improved with exercises that will not be injurious to them even in their weakened condition. But the instructor must remember that students with abnormal thyroid conditions are frequently nervous and sensitive. They do not, therefore, like to be singled out in a class as being different from the other students. For this

reason, their exercises should be of sufficient number to keep them reasonably occupied throughout the class hour, while, at the same time, these exercises should be of such a character as to enable them to lie or sit down during part of the time. Breathing exercises for abdominal contraction in the supine position, exercises for the feet taken in a sitting position, and any other exercises of mild form which the ingenuity of the instructor may devise, may be included in their schedules. Nor are the exercises everything. At the very start, it is well to let such students feel that the instructor understands their condition, is willing to allow them to take their work slowly, with intervals of rest, and to excuse them from the classroom before the end of the hour if they become fatigued or are not feeling well. At times, instead of requiring her to go through any exercises at all, it is best to send a student of this type directly to the rest room. This oversight can be given without making her in the least conspicuous. Most students are so appreciative of consideration of this sort that there is little danger that they will take advantage of such thoughtfulness on the part of the instructor.

Heart cases in the corrective gymnasium. Unless there has been no careful examination of students before they begin the work, cases of acute heart disease are not found in college or other gymnasiums; but many students having weakened conditions of the heart are to be found there. Many of these students have had valvular diseases following scarlet fever, rheumatic fever, or some other infection and are in

such a condition that, while vigorous exercise would be dangerous, moderate exercise is necessary not only to keep them in good general health, but to strengthen the muscles of the heart itself. Naturally, this work must be done most carefully and the student should be kept under close supervision by the instructor.

Amount and character of exercises. There are two facts which an instructor must understand clearly before undertaking to treat a case of weak heart: first, the character and amount of the exercise to be given; second, those symptoms of overwork or strain which are the quickest to appear.

Aim of the exercises. The aim of exercise for these conditions is to reduce a high pulse rate by flushing the peripheral vessel; to improve the muscular tone of the heart; to improve the respiration; to prevent palpitation of the heart by action upon the cardiac nerves; or to remove excessive fat around the heart.

Character of the exercises. There are two types of exercises for these conditions, one type being advocated by certain physicians and the other type by others. The exercises of effort are advocated by the followers of Schott, who developed his method at Bad Nauheim; the exercises of endurance, organized and developed by Oertel in Munich, are a combination of mountain climbing and other exercises of endurance, added to a carefully regulated diet.

The Schott Method of exercising. The Schott Method can be used to best advantage in nervous disorders of the heart and in such weakened conditions of the heart as follow influenza or other fevers, with

or without dilatation. The Schott, or Nauheim, treatment consists of resistive exercises and medicated baths. The baths are, of course, not to be given by the physical education instructor. These are given only under the advice of a physician and by persons trained for that purpose. Many of the exercises, however, may be used to advantage in the gymnasium; a brief description of them is, therefore, given here. These exercises are not meant for muscular development, but to produce certain results upon the heart and blood vessels; for this reason, resistance must be given most carefully and gently by the instructor. As it is desirable not to have the circulation interfered with in any way, the instructor should not grasp the limb to be exercised, but should place her hands flat upon it. "Self-resistance" is sometimes used with these exercises, but the instructor must remember that this type of resistance is most fatiguing; and no student should be permitted to use it for exercising for the heart unless she has sufficient intelligence and muscle control to regulate the amount of resistance as this should be done.

In the following exercises all resistance is given by the instructor, and the amount of resistance must be regulated by the condition of the student, and according to the advice given by the physician in charge.

Exercises Prescribed in the Schott Method

Exercise I.

POSITION. Lying, sitting, or standing; the instructor's hands lying flat upon the student's wrist.

EXERCISE. Extend the arms forward to shoulder

level; then, at the same level, bring them back to the sides.

Exercise II.

POSITION. Lying, standing, or sitting. The arm flexed; one hand of the instructor supporting the student's elbow; the other pressed, first, against the back, then against the front, of the student's wrist.

EXERCISE. Extend and flex the arm against resistance.

Exercise III.

POSITION. Standing, with the arms down at the sides, palms forward, the instructor's hands pressed first against the ulnar, then against the radial side, of the student's wrist.

EXERCISE. Raise the arms sideways, overhead; then bring them down sideways to position.

Exercise IV.

POSITION. Standing, with the hands clasped in front of the abdomen, the instructor's hands clasped lightly around the student's wrist.

EXERCISE. Raise the arms up overhead, keeping the hands clasped; then bring them down to first position.

Exercise V.

POSITION. Standing, with the hands down at the sides and the palms against the thighs. The position of the instructor's hands is described in "Hints to the Instructor."

EXERCISE. Raise the arms forward and upward to overhead position; then lower the arms to first position.

HINTS TO THE INSTRUCTOR. This last is one of the most difficult exercises for giving resistance steadily and gently. At the beginning of the exercise the instructor's fingers should press the radial side of the student's wrist. As the arms are raised, the instructor should lightly grasp the student's wrist, which, in this part of the exercise, should rest in the V which is formed by the instructor's thumbs and fingers. When the shoulder level is reached, the instructor's hand should be so turned as to support the student's wrist upon her forefinger and thumb. As the arm reaches a lower level, the instructor should resist with pressure of her fingers, against the ulnar surface of the student's wrist. A little practice may be necessary before an instructor can give this exercise smoothly and gently.

Exercise VI.

POSITION. Standing, with the hands on the hips, the instructor's hand first on the upper sternum of the student, then against the middle dorsal vertebræ.

EXERCISE. Bend the trunk forward; then raise it to correct position.

Exercise VII.

POSITION. Standing, with the hands on the hips, one of the instructor's hands upon the advancing shoulder of the student, the other clasped over the shoulder which is being drawn backward.

EXERCISE. Rotate the body from the waist, first to one side and then to the other.

Exercise VIII.

POSITION. Standing, with the hands on the hips, one of the instructor's hands placed under the armpit of the student, the other against the student's hip, both on the side toward which she is to bend.

EXERCISE. First bend the trunk sideways to the right; then to the left; then to erect position.

Exercise IX.

POSITION; EXERCISE. Same as Exercise II, but with the fist clenched.

Exercise X.

POSITION; EXERCISE. Same as Exercise IX, but with the palm turned out. Exercise first one arm, then the other.

Exercise XI.

POSITION. Standing, with the arms down at the sides, the palms in, the hands of the instructor lightly clasped around the student's wrists.

EXERCISE. Bring the arms forward and overhead, the palms in; then lower the arms sideways to position, the palms down.

Exercise XII.

POSITION. Standing, with the arms down at the sides, the instructor standing behind the student and grasping her wrists lightly.

EXERCISE. Carry the arms backward and up as high as possible without bending the trunk forward. Lower them to place.

Exercise XIII.

POSITION. Standing beside a chair or table upon which the student's hand can be placed for support, the instructor's hand first placed against the student's knee, next under the knee.

EXERCISE. Resting the weight upon one leg, flex the thigh of the other leg on the trunk, letting the leg hang loosely down, then return to place. Exercise each leg in turn.

Exercise XIV.

POSITION. The same as in Exercise XIII, the instructor's hand pressing against the student's leg just above the ankle.

EXERCISE. Raise the extended leg forward then backward. Exercise first one leg then the other.

Exercise XV.

POSITION. Standing, with both hands resting on a table or chair, the instructor's hand first against the student's heel, next in front of the ankle.

EXERCISE. Flex the leg on the thigh, then bring back to place. Exercise first one leg and then the other.

Exercise XVI.

POSITION. Standing as in Exercise XIII, the instructor's hand against the student's ankle.

EXERCISE. Raise the extended leg out toward the side and back to place.

Exercise XVII.

POSITION. Standing, with the arms out at the sides

at shoulder height, the instructor's hands lightly grasping the student's wrists.

EXERCISE. Rotate the arms first backward, then forward.

Exercise XVIII.

POSITION. Sitting or lying; the instructor's hand pressed against the palm or the back of the student's hand.

EXERCISE. Flex and extend the hand.

Exercise XIX.

POSITION. Sitting or lying; the instructor's hand pressed against the sole or back of the student's foot.

EXERCISE. Flex and extend the foot.

Regulating the amount of work. An instructor should thoroughly understand the degree and kind of heart weakness before she begins to treat a case of this kind. This information she should obtain from a physician whose knowledge and experience enable him to decide the amount of work which will be of benefit to the student. If the instructor is working in a gymnasium where the students are not examined before being put under her supervision, she should insist that a physician be asked to make an examination before she begins her work.

Exercises few at first. All work designed to benefit a weakened heart should at first be very light. The exercises should be few in number and easy to execute; and they should be repeated only a few times in any one exercise period. Later on, progress may be made by increasing the number of

times each exercise is repeated. The next step is to add new exercises of greater difficulty and it is well to decrease the number of exercises which the student is already taking, in order that she may not become overfatigued by an increase in her amount of work. Such exercises as leg-lifting and trunk-bending should be the last to be added, for they are sometimes most difficult for a person with a weak heart. It is especially important that an instructor consider not only the immediate effect of an exercise, but its effect upon the student through what remains of her day after she has exercised. An instructor must, therefore, keep herself informed as to the student's condition and must regulate her exercises accordingly.

Adverse symptoms. An instructor must not attempt to treat a case of weak heart unless she has time to give close oversight to the student as she works. Different people are affected differently by the same exercises; and an instructor who is working with a person who has a weak heart must be quick to recognize an adverse symptom, and stop the exercise. Adverse symptoms for which to watch are irregular or increased breathing, excessive perspiration, quickened pulse, palpitation, and cyanosis.

While the exercises are being taken, the instructor must watch to see that the breath is not held, but that breathing is free and regular. Sufficient rest should be taken between the exercises, and, if necessary, the student should rest, by lying down, in the middle of the class hour. Resistance must be regulated carefully, made very light at first, and preferably given by the instructor.

Class work and sports. As such a student becomes stronger, she may be permitted to join in the general class exercise if it is not too strenuous. But if she is permitted to do so, she must be watched and stopped should her breathing become perceptibly irregular. Light sports, such as archery, quoits, bowling, and, in some cases, swimming, may be allowed. But it is a good rule to insist that these heart cases be re-examined by a physician before permission is given for the more strenuous sports, such as tennis, baseball, and volley ball. Graduated work is usually good for the student. One student who was successfully treated for an abnormal heart started with the lightest possible gymnasium work and sport; at the end of her second year she was allowed to play baseball; and at the end of her fourth year she was able to do what she pleased in the way of sports, with no bad results whatever.

CHAPTER XX

EXERCISES FOR REDUCING WEIGHT

Excessive flesh. Exercises for reducing weight belong to the corrective or remedial department, for excessive flesh is not alone a question of appearance; it is frequently one of health also. Excessive flesh will in many cases make a young person sensitive and awkward and prevent him or her from joining in those activities which would give a needed amount of exercise. Many people take up gymnastic work for the one purpose of reducing. If fat is equally distributed over the body, general gymnasium exercises or walking, running, or horseback riding are probably all that is necessary, with proper attention to diet. Unfortunately this is not always the case. On the contrary, excessive fat as a rule settles in those parts of the body where it is least desired, such as the abdomen, the hips, or the back of the neck. To reduce the parts so affected and to bring the body back into good form, special, well-directed exercises are necessary.

Physical fitness. Since exercises for reducing must be taken rapidly and vigorously and repeated many times, one should not attempt to take them unless physically fit to do heavy work. One also needs patience and perseverance, for it is usually necessary

to continue the work for months; and as a rule one sees little result at first.

Diet should be prescribed by a physician. If definite results are to be reached, the diet also must be regulated, and this should be done under the advice of a physician. The many and varied methods of dieting and starving that are practiced without sufficient knowledge of their effect upon the general physical condition or thought of possible injury, are too numerous to mention. That many persons are weakened and in other ways injured by improper diet, used with the hope of reducing weight, is undoubtedly true. The most successful treatment of cases of obesity is that given under the guidance of a physician who directs the diet and medications (if such are necessary), the gymnasium instructor prescribing and giving the exercises.

Increase exercise gradually. At the beginning of the treatment a limited number of exercises should be taken and these repeated only a few times, so that there will be neither a great amount of fatigue nor muscle soreness; but the number and variety may be increased rapidly, until at least fifteen exercises are being repeated from fifteen to twenty times once a day and every day. This is necessary if there is to be the desired result from their use.

Exercise for Reducing the Neck

Exercise I.

PURPOSE. To reduce the neck and the muscles on top of the shoulders.

POSITION. Standing or sitting, with the hands on the hips.

EXERCISE. (a) Bend the head forward until the chin rests upon the chest. Tightening the muscles in front of the neck, and keeping the chin down, bend the head back as far as possible. Tightening the muscles in the back of the neck, bring the head forward again.

(b) Turn the face toward the right shoulder, tighten the muscles of the neck, and turn the face towards the left shoulder. Repeat, turning from side to side.

(c) Roll the head on the neck, first around one way then the other, keeping the muscles in the neck tight.

*Exercises for Reducing the Arms,
Shoulders, and Breasts*

Exercise II.

POSITION. Standing.

EXERCISE. Swing the arms in circles: (a) forward and around; (b) backward and around.

Exercise III.

POSITION. Standing.

EXERCISE. Swing the arms forward across the chest at shoulder height, then backward as far as possible.

Exercise IV.

POSITION. Standing.

EXERCISE. Extend the arms sideways to shoulder height, with the hands clenched and the arms stiff. (a) Slowly bend the elbows and bring the fists to the



FIRST POSITION IN EXERCISE VIII (CHAPTER XX)

shoulders. (b) Keeping the arms stiff, extend them and then bring them down to the sides.

Exercise V.

POSITION. Standing, with the arms at the sides.

EXERCISE. (a) Bend the elbows, keeping them at the waist, and bring the clenched fists to the shoulders. (b) Extend the arms forward, then back to position (a). (c) Thrust the arms overhead, then back to position (a). (b) Thrust the arms out at the sides, shoulder height, and bring them back to position (a). Repeat.

Exercise VI.

POSITION. Standing.

EXERCISE. Swing the arms rapidly up sideways and overhead and down to sides.

Exercise VII.

POSITION. Standing, with arms at the sides.

EXERCISE. Hold the arms down and slightly forward with the palms toward each other. Then twist them vigorously in and out.

Exercise VIII.

POSITION. Standing, with face turned to the left and left arm up.

EXERCISE. Swing the arms up and down at the sides: (a) right up, left down; (b) left up, right down. Do this rapidly and let the trunk sway with the movement. Keep the eyes on the upward arm, quickly turning the head to left and right. (See page 217 and frontispiece.)

*Exercises for Reducing the Trunk, the Arms,
and the Shoulders*

Exercise IX.

POSITION. Standing, with the arms crossed over the chest.

EXERCISE. (a) Swing the arms down and back, at the same time bending the trunk forward. (b) Swing the arms forward and overhead, bringing the trunk up and slightly back.

Exercise X.

POSITION. Standing, with feet well apart, the knees stiff, the arms overhead and palms together.

EXERCISE. Bend the trunk forward, and with the hands held close together touch the toes first of one foot, then of the other.

Exercise XI.

POSITION. Standing, with the feet well apart and the arms out at the sides.

EXERCISE. Twist the body rapidly from side to side, letting the arms swing over the chest, the right arm to the left as the body twists to the left, the left arm to the right as the body twists to the right.

Exercise XII.

POSITION. Standing, with relaxed arms hanging at the sides.

EXERCISE. Twist the trunk rapidly (right, left; right, left), keeping the knees stiff.

*Exercises for Reducing the Abdomen and Strengthening
the Abdominal Muscles*

Exercise XIII.

POSITION. Standing, with the arms hanging relaxed at the sides, and with back and shoulder muscles somewhat relaxed.

EXERCISE. Voluntarily and forcibly contract the abdominal muscles, drawing the upper part of the body slightly forward with the force of the contraction. Relax gradually, and repeat.

POSSIBLE ERROR. Using the muscles of the shoulders and chest.

HINTS TO THE INSTRUCTOR. This exercise is a little difficult at first, as are many exercises which require muscle control. It is possible that it may be necessary to work up to it, by teaching the movement with the student on her back, until she learns to contract her abdominal muscles without trying to use her chest and her breathing muscles.

Other Abdominal Exercises.

See Chapter IX for other abdominal exercises.

Exercises for Reducing Hips and Legs

Exercise XIV.

POSITION. Standing, with one hand resting on a table or stall bar, and the body stiff.

EXERCISE. (a) Lift the leg opposite the supporting hand and with straight knee swing it backward and forward. (b) Swing it out at the side. (c) Swing in semi-circles, forward and around, backward and around.

Repeat the exercise with the other leg.

Exercise XV.

POSITION. Standing, with the feet a short distance apart, the arms at the sides.

EXERCISE. (a) Without moving the shoulders or the feet, sway the hips from side to side. (b) Make a circular movement with the hips over the feet as a central point.

Exercise XVI.

POSITION. Standing, with the hands on the hips.

EXERCISE. Spring, and cross the feet, right and left, bringing each foot first in front of, then in back of, the other.

Exercise XVII.

POSITION. Standing, with the feet well apart, the hands on the hips.

EXERCISE. Sway the body slightly from side to side by using the muscles of the thighs and hips. Do not bend at the waist.

POSSIBLE ERROR. Using the exercise as a "side bending" movement, and so using the muscles of the back and abdomen and not the thigh muscles.

HINTS TO THE INSTRUCTOR. This exercise, like all exercises in which unusual muscle control is required, may require much patience and perseverance on the part of both instructor and student. But corrective gymnastics will have failed in one of its branches if the student who is taking it does not improve in muscle control.

Exercise XVIII.

POSITION. Standing.

EXERCISE. (a) Raise the right leg, the knee bent, and grasp the knee with the left hand; then twist the body from side to side. (b) Change and stand on the right foot, lifting the leg and twisting the body.

Exercise XIX.

POSITION. Lying on the back, with the legs extended.

EXERCISE. (a) Rotate the thighs in, then out. (b) Swing the legs in and around, making a semi-circle, then out and around. (c) Swing the legs apart, then together.

Exercise XX.

POSITION. Lying on the back, with the knees flexed.

EXERCISE. Separate the knees, giving resistance with the hands; bring them together again, resisting.

General Exercises for Reducing the Whole Body

Exercise XXI.

POSITION. Standing, with the hands on the hips.

EXERCISE. Circle the trunk to the right and to the left, keeping the knees stiff and the chest and head in good position.

Exercise XXII.

POSITION. Standing, with the hands back of the neck, the knees stiff.

EXERCISE. (a) Bend the trunk backward then

forward. (b) Bend the trunk sideways, right and left. (c) Twist the trunk right and left.

Exercise XXIII.

POSITION. Standing, with the hands back of the neck, the knees stiff.

EXERCISE. Rise to the tiptoes. Bend the trunk forward, to the right, to the left, to the front, then up to position.

Exercise XXIV.

POSITION. Standing, with the feet apart.

EXERCISE. Raise the arms overhead, slowly sink to a knee-bent position, keeping the head and chest in good posture. Rise to standing position, at the same time bringing the arms down to shoulder height, the hands back of the neck.

Exercise XXV.

POSITION. Lying on the face, with the hands back of the neck.

EXERCISE. (a) Raise alternating legs backward and up. (b) Raise both legs. (c) Raise the legs and trunk backward.

Exercise XXVI.

POSITION. Lying on the back, with the arms crossed under the breasts.

EXERCISE. (a) Roll over and over, from side to side, using the muscles of the whole body. (b) Roll over and over, using the muscles of the abdomen and lower back muscles.

Exercise XXVII.

POSITION. Standing, with the hands on the hips.

EXERCISE. (a) Charge forward on the left foot, raise the right arm up, stretch the left arm back. Bend the trunk and, twisting toward the left, with right hand touch the floor as far in front of the left foot as possible. (b) Charge forward on the right foot, left arm up, right back, and with left hand touch in front of the right foot.

Exercise XXVIII.

POSITION. Standing, with the arms extended sideways.

EXERCISE. Bend first to one side then to the other, keeping the arms stretched well out.

CHAPTER XXI

TREATMENT OF SUBNORMAL CASES

Students who belong neither in athletic nor corrective group. Students who are sound physically are often given a great deal of attention in physical education, not only because they are full of life and therefore interesting, but because, with much virility, they demand activity of some sort, and exercises to meet their needs must be of a strenuous and competitive nature. But there is another group which presents a different problem. This group is made up of those who are not able to stand heavy gymnasium work or competitive sports, but who do not need special orthopedic exercises. Such students as these, though having regular work in classes, must be given a certain amount of individual oversight, and the exercises given must be light.

Disabilities that characterize this group. The disabilities in this group, though they may in many cases come from a common and single cause, may vary as to the form in which they manifest themselves. The instructor should, therefore, understand thoroughly the causes of the incapacity and its effect on the individual in order that she may determine the nature and extent of the exercises to be given.

That branch of gymnastic work which is devoted to the treatment of subnormal cases includes students having cardiac and acute menstrual disorders, active thyroids, and deformities which can not be corrected. The policy of permanently excusing subnormal students from all gymnasium work does not seem wise, since they need some form of exercise. This exercise must, however, be taken under supervision; and if it is combined with instruction in personal hygiene, great benefit should be derived therefrom.

Before work is begun with these students, a thorough medical examination should be given by a physician, and no work should be undertaken by the instructor until she has received his report.

The student's daily report. In order to make the instruction personal to each student, some method of checking up on her daily life is found to be advisable. For this the blank on the following page is suggested.

In the blank, the student can, by checking with numbers, in a very short time make a report sufficiently full to be satisfactory to the instructor. At regular intervals the students should bring their blanks to the instructor for discussion; and, in order that each student may be reached, there should be certain days appointed when nothing but a discussion of the reports takes place. In order to be helpful, these discussions must be practical, and the instructor must never lose sight of the psychological effect they may produce upon the student. She must, for example, be careful not to appear dictatorial or overcritical in her manner of giving advice, and her explanations should always be simple and direct.

THE UNIVERSITY OF WISCONSIN

DEPARTMENT OF PHYSICAL EDUCATION FOR WOMEN—CORRECTIVE DIVISION

JANE K. DOE

January

Name

Month

HEALTH REPORT

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Sleep (No. of hours).....	6	7	7	9	8	6	12	7	7	7	9	8	12	6	6	9	9	7	6	10	7	8	9	8	6	6	8	6	8	7	
Exercise (outdoor hours)....	1	½	½	½	½	1	20'	½	½	1	1	1	½	½	½	1	1½	1	½	½	20'	½	½	1	1	1½	1	1	1	1	
Rest (amount during day)...			10'		15'				1							20'	20'	20'	10'				10'	20'	10'		10'	30'	10'	10'	
Meals.. { Milk.....	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
{ Fruit.....	1	2	1	2	1	2	1	1	1	2	1	1	2	3	2	2	3	1	1	3	1	1	2	1	2	1	2	1	2	2	
{ Vegetables.....	1	2	1	2	1	2	1	1	1	2	1	1	2	3	2	2	3	1	1	3	1	1	2	1	2	1	2	1	2	2	
Water (glasses per day)....	2	2	3	3	3	2		3	4	2	3	3	3	3	4	5	5	4	5	4	4	3	4	4	3	4	4	3	2	4	
Tea..... } Cups per day {	3	2	2		3		1	2	2	1	2	2	3	3	2	1	1	2	3	1	1	2	2	2	2	2	3	3	2	1	
Coffee.... }				Yes			Yes				Yes										Yes					Yes					
Constipation.....																						Yes									
*Menstruation.....																															
Theatre.....		√										√						√													
Club.....																															
Dances.....																															
Weight... { Actual, 105....																															
{ Normal, 121....															107							√								109	

Remarks..... Took laxatives

Cold in head

*Discomfort, 1.
No pain, 0.
Slight pain, —.
Severe pain, +.
Absent from classes, A.

SUGGESTIONS

- (1) 10 minute rest before supper.
- (2) Stretch over blanket for 10 minutes before going to bed.
- (3) Try more vegetables even though not liked, spinach especially.
- (4) Leave out cup of coffee at night.
- (5) More H₂O—coarse food.

Purpose of the work. The purpose of the work done in this class should be mainly remedial. First, the instructor should show the students where they are using strength unnecessarily and teach them how they may so direct their energies as to conserve them and thus reach a higher degree of efficiency; next, she should explain how, by proper feeding and resting, they may increase their strength and energy.

The first work in class. In this course, as in all courses in corrective gymnastics, the first thing necessary is to develop in the students a kinesthetic sense in all the larger groups of muscles which control the positions of the lumbar, dorsal, and cervical spine. The use of the skeleton and various charts increases interest and helps the students to understand and remember. This instruction will help them to understand the possibility of conscious control of the different single groups of muscles which hold the spine in an efficient working position. After having worked with each group separately, the instructor should give exercises to teach coördination between the groups and a more permanent static contraction when these groups of muscles are not being actively used.

It is well to start with an analysis of standing and walking, since these exercises may be put into immediate practice and all subsequent work in the course is based upon them. The correct method of walking should be demonstrated by the instructor, and the students should practice this in the class under direct supervision. In teaching walking, an analysis of the muscles used, how and when they are used, the

position of the trunk, and the transference of weight in the act of walking should all be explained clearly.

At the very beginning, at least one class period should be employed for teaching breathing and relaxing exercises and explaining the object of these exercises. After the exercises have been carefully taught they should be given as a part of each class period. Instruction should also be given in the correct use of the body in the ordinary movements of the day, such as sitting down to rest or write, climbing stairs, lifting, or working in stooped positions. A sufficient amount of time should be devoted to instruction in these movements to enable the instructor not only to explain and demonstrate the correct methods, but also to have the students practice the different movements before the instructor until they can execute these correctly.

Correct use of the feet should be taught; and talks should be given on the hygiene of menstruation and the causes of constipation. With all of these talks, charts and the skeleton should be used. Simple remedies for constipation may also be suggested, and exercises may be given for the various abnormal conditions.

Some typical cases. The following cases have been cited for the purpose of showing what good results are possible if the instructor studies the hygiene reports and discusses them seriously with the students. The response from such a method of handling a class is usually satisfactory; and if the instructor is sympathetic and not censorious, the reports given by the students will be found frank and truthful.

Case I. A student with a cardiac trouble and a very low health grade. The first interview with this girl brought out the fact that she was not getting sufficient sleep and rest. She was firmly convinced that it was impossible for her to go to bed earlier or sleep later than she was doing, because she had so much studying to do. But when it was suggested to her that she might take two or three short rests through the day at hours when she was not studying, she was quite willing to coöperate. The rest periods selected in her case were just before meals and just after her last class period. These short periods of rest, taken two or three times a day, amounted to a considerable time when counted as a whole. In the case under discussion the results were excellent, and the girl's condition improved greatly.

Case II. A student whose health history showed several attacks of pneumonia and a family tendency to tuberculosis, her brother having died of the latter disease. When this girl first came to the class, her skin had a greyish pallor, and she expressed a nervous dread of the work assigned her for fear of its causing coughing and a pain in her chest. After three or four weeks of routine work in the subnormal gymnasium class, she was advised to go to her physician for reëxamination. Since this examination proved that her pains were not caused by lesions in the lungs, but were muscular, her whole attitude towards life suddenly changed. The pains in her chest disappeared; her appetite improved; and she gained weight. In fact, she became more vigorous in every way, and she now looks and acts like a different individual. The development of

this case shows what can be accomplished by carefully supervised exercises on the one hand, and a thorough medical examination, frankly explained, on the other.

Case III. A student whose report showed that she was taking very little recreation, eating scanty meals, sleeping little, and verging on a nervous breakdown. In talking to this girl, the instructor found that she was doing all the family cooking, washing, and ironing, and had, therefore, no time for recreation. Since it was found that her family was financially able to employ help for the heavy work, the girl was given tactful encouragement and assistance in inducing her family to hire a woman to relieve her. She was thus given time for recreation and was enabled to eat away from home at least once a week. As a result, her condition improved rapidly.

Case IV. A student whose report showed a general low health condition and who appeared very hysterical. The instructor found in talking to this girl that she had recently suffered from a nervous breakdown, and that she was having very vivid and terrible dreams. She fancied herself unable to relax; but, after being taught breathing and relaxing exercises, she found she was able not only to relax, but really to rest when she lay down. Her strength has now improved, and she sleeps without dreaming. The relaxing exercise that she uses is the following: She lies down for at least twenty minutes, with her arms stretched over her head, and a blanket, folded to about sixteen inches in length by four inches in width, placed under the middle of the dorsal spine. This exercise is taken several times a day.

Case V. A student whose report showed her a constant sufferer from constipation and a slave to laxatives. The instructor advised certain exercises and the use of bran with the diet, which proved to be what was needed in this girl's case. By these simple means the student has been able to cure her constipation and is no longer dependent upon laxatives.

Type of gymnastic work given to subnormal cases.

As may be seen in the preceding report, the work given in these special classes for subnormal cases is a combination of light gymnastics and instruction in hygiene. The purpose of the work is primarily a remedial one, exercises being given for correction rather than for pleasure or bodily stimulation. The one important thing in this class of work is so to interest the pupil that what she is taught in class about hygiene and the use of her body will be carried over into her everyday life. To attain this end she must be given something which can be practiced at any hour of the day rather than in just the short time in which she is doing the formal work in the gymnastic classroom. And if, in addition, she is taught a proper understanding of the body's mechanism and of her own particular weakness, she will be prevented from injuring herself by the improper use of her muscles.

The strain of college life must be met. College life, with its serious studies and no less taxing outside activities, calls upon all the physical and nervous energy that a girl possesses. Unless she has a good supply of such energy, she will by the senior year be worn out and nervous. She must be in good physical condition to be able to accomplish properly the four

years of college work, and if she is not physically fit she must be helped to become so.

As has been explained in this chapter, mere attendance at gymnastic classes is not enough for the subnormal girl, however well she may work during class time, for by one half hour's incorrect posture later she may undo the good work of the most effective gymnastic drill. Tactful advice and instruction which will teach her how best to conserve her own strength and to improve her bodily condition, as well as remedial exercises suited to her particular weakness, are what the subnormal girl should have.

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